Explaining fertility outcomes within the urban poor: A case study of Chittagong, Bangladesh

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Declaration for PhD thesis

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Abstract

This century the population of Bangladesh will increase from 150m to 250m, with 70% of this growth concentrated in urban areas primarily due to rural-urban migration by the poor. The family planning programme aims to reduce fertility rates in Chittagong. The poor have the highest fertility rates in Chittagong.

The aim of the study was to develop an explanation for why some couples within the urban poor of Chittagong have a low fertility outcome of ≤ 2 living children whilst other very similar couples have a high fertility outcome of ≥ 4 living children, in order to inform family planning programmatic interventions.

A new small-N comparative approach, Counterfactual Mechanism Analysis, was developed for context-specific operationalisation of theorised causal chains leading to the fertility outcome and producing a causally symmetric explanation under a Ready, Willing and Able framework.

The result from the small-N investigation suggests that some couples with low/high fertility outcomes formulate initial fertility preferences in response to the congruence of the husband's and wife's individual perceptions of social approval regarding the number and sex composition of children. Readiness to limit fertility can adjust dynamically for both husband and wife based on the importance of sex composition and whether it is being attained. For the wife, stillbirths and miscarriages can also adjust Readiness. The wife's Willingness to limit fertility and use modern family planning methods depends on the norm of her social network. The wife's Ability to acquire modern family planning methods depends on subjective cost. The relevancy of the explanation to similar couples within the population of interest is supported by patterns exhibited in secondary data. Interventions based on the current priorities of the family planning programme are considered unlikely to succeed in reducing the fertility outcomes of the urban poor in Chittagong.

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Abbreviations

BDHS	Bangladesh Demographic and Health Survey
CPR	Contraceptive Prevalence Rate
DGFP	Directorate General of Family Planning Bangladesh
FAB	Fertility awareness-based methods
FDA	Food and Drug Administration
HPNSDP	Health, Population and Nutrition Sector Development Program
LAPM	Long-acting and Permanent Method
MICS	Multiple Indicator Cluster Survey
RTI	Reproductive Tract Infection
RWA	Ready, Willing and Able
TFR	Total Fertility Rate
UESD	Bangladesh Utilisation of Essential Service Delivery Survey

Chapter 1. Introduction

This introductory chapter examines recent trends and regional differences in fertility across Bangladesh, discusses the nature of a looming demographic crisis that the country faces, details the ambitious family planning programme targets in place, explains why the fertility of the urban poor within Chittagong is of particular importance to the whole of Bangladesh, outlines the aim of the study, and provides an overview of the organisation, methodology and key findings of the study.

1.1 - Background

When Bangladesh won its independence from West Pakistan in 1971, its economy was in disarray, the bureaucracy had collapsed, universities and training institutes had been decimated, many critically important health facilities had been destroyed and famine was imminent (Cleland et al. 1994:106-107).

Public health sector operations commenced with an underlying emphasis on population control and the additional aim of providing 'minimum' healthcare to the population, particularly the poor and disadvantaged (Osman 2008:264).

Given that the war of independence had been particularly debilitating for the health and social sectors (Cleland et al. 1994:107), the First Five Year Plan (1973-8), with population control its priority, focused on the development of health and family planning infrastructure and organisation, and the recruitment and capacity building of personnel (Cleland et al. 1994:107; Osman 2008:264; Robinson 2007:334). The plan also outlined a multisectoral approach which allocated some family planning activities and responsibilities across eight different ministries and placed the family planning programme under the auspices of the Ministry of Health and Family Planning (Robinson 2007:334).

The First Five Year Plan marked the beginning of a commitment in Bangladesh to the adoption of a broad-based multisectoral population control and family planning programme (Cleland et al. 1994:107). By 1975 the programme was up and running (Robinson 2007:334). The first population policy of 1976, which was to closely influence successive Five Year Plans, adopted the key strategy of providing

comprehensive family planning services through clinics and women fieldworkers with a particular emphasis on the provision of doorstep services to women living in rural areas (Osman 2008:264-265)

Initial scepticism regarding the magnitude of the rapid fertility decline that subsequently occurred in Bangladesh, given its persistently low levels of socioeconomic development, was later swept aside by evidence provided by the Demographic and Health Surveys of the 1990s confirming substantial increases in the use of modern contraceptive methods by the end of the 1990s (Jones & Leete 2002:116). Thus, the plummeting decline in fertility from a total fertility rate (TFR) of 6.5 births per woman in the mid 70s to a TFR of 3.3 births per woman during the first two decades of the programme is described as "a historic record in demographic transition" (Rahman, DaVanzo & Razzaque 2003:343). During this period Bangladesh was the only country amongst the world's twenty poorest to register anything like a considerable decline in fertility (Barkat-e-Khuda & Hossain 1996:155).

In the period spanning 1993-2002, often referred to as the decade-long fertility plateau, the TFR in Bangladesh remained steady at around 3.3 births per woman (NIPORT et al. 2009:XXV; Streatfield & Karar 2008:261), and thereafter continued its downward trajectory to the most recently reported TFR of 2.3 births per woman (NIPORT et al. 2013:62)

Within the literature examining the fertility transition in Bangladesh, explanations regarding the underlying driving factors for the fertility decline continue to elude consensus.

Some commentators argue the fertility decline in Bangladesh was not driven by the associated socioeconomic changes that are usually considered a necessary condition for fertility decline by the dominant cost-benefit derived frameworks (see Bryant 2007). Instead, the fertility decline is seen to have resulted primarily from the successful implementation of a family planning policy which promoted small family norms through ideational change and enabled already desired fertility reduction amongst couples through the widespread provision and accessibility of contraceptives (Cleland et al. 1994).

Others dispute this ideational and family planning innovation explanation and argue that Bangladesh did experience substantial changes in economic structure, urbanisation, women's education and employment, and these changes acted as the main driver of the fertility decline (Caldwell et al. 1999).

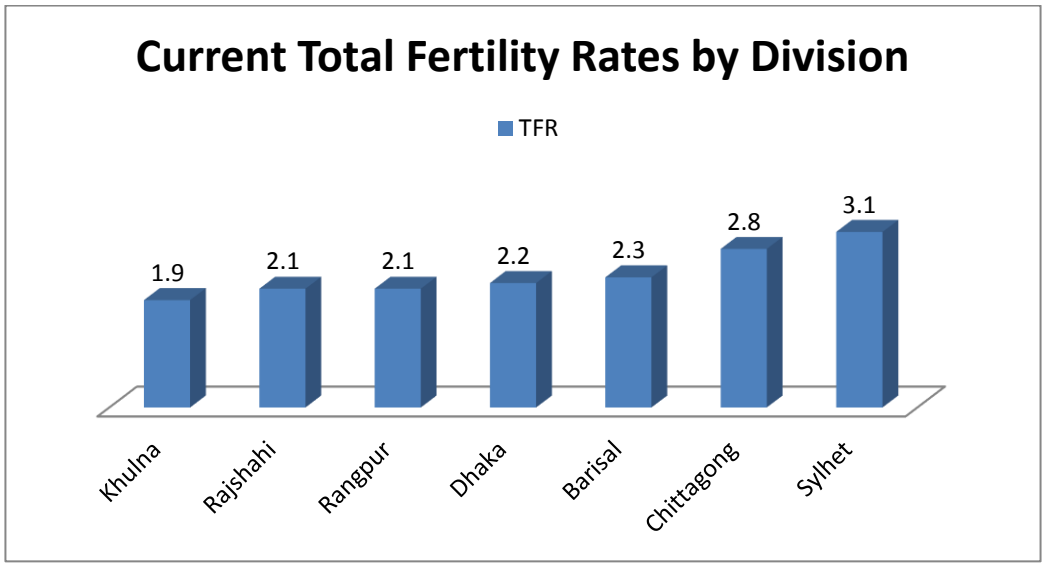
The difficulty in finding a convincing explanation for the overall fertility decline since the 1970s in Bangladesh stems from three sources.

First, a number of commentators assert that demography, the discipline we would usually look towards for an explanation, is a discipline that is driven primarily by the availability of data and is generally lacking in theory (Greenhalgh 1996; McNicoll 1980). Ryder (1984, cited in Cleland 2001) similarly suggests that demographers suffer the "tyranny of the quantifiable" (Ryder 1984: 300, quoted in Cleland 2001) by allowing the conceptualisation process to be dominated by the availability of data. Given however that the development of an explanation for the overall decline in Bangladesh's fertility would require data covering the whole country, the difficulties in proceeding with a theory driven approach not subject to the limitations imposed by the use of secondary data appear insurmountable.

Second, Mason (1997) argues that whilst there are many theories of fertility transition, all of which contribute important ideas, no single theory is capable of providing a universally applicable explanation for fertility decline. This implies the necessity of examining a range of theories and adopting a context-specific approach in pinpointing which particular aspects or ideas within these theories might be relevant in developing a separate plausible explanation for each delineated context within Bangladesh, a most challenging prospect.

Third, and related to the importance of proceeding with a context-specific approach, there is a high degree of regional variation in fertility rates across Bangladesh (see figure below), and this regional pattern of fertility is inconsistent with both socioeconomic and ideational based explanations.

Figure 1.1



Source: NIPORT et al. 2013:62

With regards to the explanations based on the socioeconomic determinants of fertility, Caldwell et al. (1999) argue that the fertility decline in Bangladesh was accompanied by substantial changes in economic structure, urbanisation, women's education and employment. Islam et al. (2010:716) however note the paradox of high fertility in Chittagong and Sylhet as the relationship between fertility and wealth – neither division is economically backward due to a high level of overseas remittances to these divisions from expatriate males working in the Middle East and Western Europe (see also Mannan & Beaujot 2006). Chittagong is a major centre in Bangladesh (alongside Dhaka) for garment manufacturing, employing mainly female workers (Rahman et al. 2003:344). Yet Chittagong and Sylhet are the two divisions which have doggedly maintained the highest fertility rates relative to all other divisions (see NIPORT et al. 2013:62; 2009:49; 2005:51), and display a time-lag of almost ten years in their fertility declines relative to Khulna division which has the lowest fertility rate (Islam et al. 2010:714-716).

Ideational and family planning innovation theories argue that both the spread of ideas relating to the desirability of limiting fertility and the spread of new contraceptive techniques to enable this through the successful implementation of family planning programmes were the major factors driving the fertility decline in Bangladesh (Cleland et al. 1994; Cleland & Wilson 1987). Whilst it is acknowledged that Chittagong and

Sylhet divisions were less well served by the family planning programme in contrast to other divisions, these differences are considered too minor to convincingly attribute the divisional differences in fertility to this factor alone (Cleland et al. 1994:138-139). Instead, a culture of conservatism and tradition are suggested as the major impediment to ideational change in Chittagong and Sylhet (Cleland et al. 1994:139-140; Mannan & Beaujot 2006:57). This argument does not however appear convincing when it is considered that both Chittagong and Sylhet divisions display lower levels of son preference compared to the rest of Bangladesh (Islam et al. 2010:711). Strong son preference is in theory considered a core, almost defining, characteristic of conservative, traditional and patriarchal high-fertility contexts (Cain 1978:432; Caldwell 1976:345, 1978:556), and has a direct influence on increasing fertility levels because in contrast to preferences for a particular number of children of any sex, preferences for a particular number of children of a specific sex most often also entail the birth of 'extra' children of the 'unwanted' sex (Bongaarts & Potter 1983). The 'cultural' explanation for the relatively high levels of fertility in Chittagong and Sylhet divisions when compared to the rest of Bangladesh therefore in essence represents a 'black box' fall-back argument that appears to excuse why ideational and family planning innovation theories are unable to explain the continuing high fertility rates of Chittagong and Sylhet without offering any real insight as to which particular aspects of culture are relevant and how or why these are relevant to fertility in these divisions. Therefore, whilst Bangladesh is often lauded as an example of how “a good family planning program can reduce fertility, even in very poor countries” (Jain & Ross 2012:15), the fact that the fertility programme was unable to successfully reduce fertility in Chittagong and Sylhet to the same extent as in the rest of the country often bypasses mention.

In summary, Bangladesh has achieved a remarkable national decline in fertility over the last five decades with a reduction from a TFR of 6.3 in the mid 70s to a TFR of 2.3 according to the most recent data (NIPORT et al. 2013:64). Whilst Chittagong and Sylhet divisions have also experienced fertility declines, their declines have persistently lagged behind that of other divisions (Islam et al. 2010:714-716). There remains no consensus as to the key drivers underlying the overall fertility decline that Bangladesh has experienced, and explanations for the continuing relatively high levels of fertility in

Chittagong and Sylhet divisions tend to venture no further than the black box 'cultural' explanation. As Islam et al. (2010:707) note:

"..there has been little exploration of demographic data from the high fertility regions of Sylhet and Chittagong, particularly on the varying roles of social and economic factors in determining reproductive behaviour."

Despite the substantial overall reduction in fertility, Bangladesh is today on the brink of a major demographic crisis. Filling the glaring gap in knowledge with regards to the high fertility divisions of Bangladesh is all the more important now. The looming crisis and the critical importance of the fertility of the urban poor in Chittagong is discussed in the following sections.

1.2 - The Looming Demographic Crisis

Although Bangladesh has experienced a remarkable fertility decline over the last few decades, with a current estimated population of 150 million, population projections indicate the addition of another 100 million people over the course of this century (Streatfield & Karar 2008).

Although Bangladesh is still predominantly rural with only 25% of the population living in urban areas, 70 million of the projected 100 million increase in population is expected to swell the current estimated 35 million urban population bringing it to over 100 million, primarily due to rural-urban migration by the poor (CUS et al. 2006:13; Streatfield & Karar 2008:265).

Poor rural-urban migrants typically find shelter in slums and squatter settlements when they arrive in urban areas (CUS et al. 2006:13). One third of the urban population in Bangladesh already consists of slum inhabitants, with their number doubling every ten years, twice the rate of increase when compared to the overall urban population growth rate (MOHFW 2011a:11; MOHFW 2011b:200). This trend indicates that in future years, increasingly large proportions of the urban population will be constituted by slum inhabitants (MOHFW 2011a:11).

Whilst the overall population density of Bangladesh is already five times higher than that of any other 'mega' country (>100 million) at 2600 inhabitants per square mile

(CUS et al. 2006:12; Streatfield & Karar 2008:261), population density in slums is 200 times the overall population density at an astounding 531,000 inhabitants per square mile (CUS et al. 2006:12).

Due to the nature and implications of the shifting demographic fault lines described above, future health and family planning policy formulation and programmatic interventions will necessarily and increasingly be determined by the challenges faced by, and posed by, the rapidly expanding mass of the urban poor living in slums. This prospect becomes all the more daunting when it is considered that up until only very recently, public sector healthcare and family planning provisioning for slum inhabitants had been a neglected aspect of otherwise intensive and extensive programmatic efforts rolled out across the country (MOHFW 2011a; MOHFW 2011b).

Slum inhabitants are deprived of easy and affordable access to healthcare because urban areas do not fall under the purview of the government primary healthcare programme and the cost of private healthcare is beyond the means of most inhabitants (Talukder, Rob & Rahman 2009:1).

With regards to family planning, across Bangladesh contraceptive usage in urban slums is consistently lower than in rural areas (MOHFW 2011b:196). One suggested major reason for this is that the key outreach service delivery channel of the Bangladesh family planning programme based on fieldworker doorstep provision of counselling, motivation for the acceptance of contraceptives and the dispensing of contraceptive commodities has been negligible in city corporation areas with the result that eligible couples, particularly those living in slums, have remained unregistered and largely uncovered by outreach services provided both through the government family planning programme and through N.G.O family planning activities because N.G.Os tend to provide clinic based services rather than doorstep services (MOHFW 2011b:196), and the key focus of N.G.Os engaged in reproductive health related activities has been on the provision of maternal and child health services (Talukder et al. 2009:1). In consequence “For the teeming urban slums populations in Bangladesh, there is no structured family planning service” (Rob, Talukder & Khan 2010:X).

1.3 - Programme Targets and the Prioritisation of Fertility Reduction in Chittagong & Sylhet

At the time of formulation, the Health, Population and Nutrition Sector Development Program 2011-2016 (HPNSDP 2011-16) using data from the Bangladesh Utilisation of Essential Service Delivery Survey 2010 (UESD 2010) and Bangladesh Demographic and Health Survey 2007 (BDHS 2007), established the following programme implementation targets with regards to national fertility (MOHFW 2011b:189):

• To reduce the TFR from 2.5 per woman (UESD 2010) to 2.00 per woman by 2016 (although the TFR is recently reported to have further declined to 2.3 (NIPORT et al. 2013:60)).

• To increase the Contraceptive Prevalence Rate of modern methods (CPR) from 61.7% (UESD 2010) to 72% by 2016

• To reduce Unmet Need for family planning from 17.1% (BDHS 2007) to 9% by 2016

• To reduce the Discontinuation Rate of family planning methods from 56.5% (BDHS 2007) to 20% by 2016

• To increase the proportion of Long Acting and Permanent Methods (LAPM) as a share of the CPR from 7.3% to 20%

Sylhet division has the highest TFR at 3.1 and the lowest CPR (modern methods) at 35.2%, closely followed by Chittagong division with the second highest TFR at 2.8 and the second lowest CPR (modern methods) at 44.5% (BDHS 2011:62, 85). These figures are brought into perspective when it is considered that Khulna division with the lowest TFR of 1.9 births per woman has a CPR (modern methods) of 56.1% (BDHS 2011:62, 85).

In view of these divisional level variations in fertility, the HPNSDP 2011-16 classifies Chittagong and Sylhet divisions as “low performing areas” in terms of CPR (MOHFW 2011b:307) and has formulated and defined specific family planning targets at the divisional level exclusively with respect to these two high-priority divisions: to increase the CPR (modern methods) in Chittagong by 5% and Sylhet by 15% in order to achieve a level of 50% CPR (modern methods) in both divisions (MEASURE DHS 2013:2;

MOHFW 2011a:61; MOHFW 2011b:307), with a particular emphasis on the promotion of long-acting and permanent methods (LAPM) such as implants and female sterilisation in these low performing areas (MOHFW 2011b:XXI, 189; MOHFW 2012:7).

1.4 - The Urban Poor of Chittagong as the Linchpin for Fertility Reduction in Bangladesh

Chittagong division constitutes roughly 20% of the population of Bangladesh and has three times the population of Sylhet (MEASURE DHS 2013:1). A reduction therefore of 0.5 births per woman in Chittagong contributes the same to the national fertility decline as a reduction of 1.5 births per woman in Sylhet.

Islam & Nesa (2009:199) however note from their examination of TFR by educational attainment and background characteristics across Bangladesh using data from the BDHS 2004 that women classified as belonging to the lowest education category of "illiterate" and living in Chittagong division had the highest TFR at 5.4 of any examined grouping including illiterate women living in Sylhet (TFR of 5.1).

Taking education as a proxy for women's economic status, the linchpin for achieving the HPNSDP 2011-16 target of reducing the national TFR to 2.0 in order to achieve replacement level fertility by 2016 (MOHFW 2011b:182; MOHFW 2012:6) appears to rest on the success of the Bangladesh family planning programme in reducing the fertility of the poor in both urban and rural areas across Chittagong division. However, given the exponential expansion of the slum population across Bangladesh which is expected to continue unabated in the coming decades, it is the urban poor of Chittagong who appear to hold the key for the future efficacy of family planning programmatic efforts in Bangladesh.

1.5 - Aim of the Study

Whilst Chittagong division clings to its status as a high fertility region of Bangladesh, it has nevertheless experienced a decline from a TFR of 4.1 in the mid 90s to the most recently reported TFR of 2.8 (Mitra et al. 1997:29; NIPORT et al. 2013:62), although this current level is still far from a replacement level TFR of 2.0.

In a population experiencing fertility transition, declines in aggregate fertility to intermediate levels do not indicate the temporary economic rationality of having an intermediate level of fertility, but rather can be viewed as resulting from shifts in the distribution of couples living under the old pre-transitional high fertility regime towards those living under the new post-transitional low fertility regime (Smith 1989:175).

Such a shift can be indicated to by reductions in third, fourth and higher-order births compared with first and second order births (see Islam et al 2010).

Islam et al. (2010:706) note that whilst the Bangladesh Demographic and Health Survey (BDHS) provides useful information regarding fertility levels in the form of TFR estimates, no detail is offered as to patterns in the ordering and distribution of higher order births. Their marriage cohort based study utilising the data of four consecutive BDHSs from 1996-7 to 2007 finds that reductions in the progression from second to third and from third to fourth births between the most recent and the oldest cohorts is less pronounced in Chittagong (and Sylhet) when contrasted to other regions in Bangladesh. Additionally, pointing out that cohort TFRs "are only averages" (Islam et al. 2010:709) which can potentially mask the tails of the distribution, progression to fourth and higher parities in the most recent cohort is found to be substantially higher in Chittagong (and Sylhet) with 45% of women who had a third birth going on to have a fourth compared to 20.4% of women in Khulna and 23.7% of women in Rajshahi (Islam et al. 2010:709-10). Women in Chittagong are almost twice as likely to progress from a third birth to a fourth when compared to women in Khulna or Rajshahi (Islam et al. 2010:713-14).

Given therefore that a TFR of 2.0 is the HPNSDP 2011-16 target (MOHFW 2011b:189), that is, the fertility rate 'demanded' by the family planning programme is 2.0, and this level has the unique status of being the replacement level of fertility, couples who have ≤ 2 living children can be considered to appropriately represent the post-transitional couple, and because most couples in Chittagong want a minimum of four children (Islam et al. 2010:706), that is, the fertility rate 'demanded' by the couples

themselves is at least 4.0, couples with ≥ 4 living children can be considered to appropriately represent the pre-transitional couple.[1]

Because both socioeconomic as well as ideational and family planning innovation theories (see Caldwell et al. 1999; Cleland et al. 1994) are unable to explain Chittagong's continuing relatively high fertility levels when compared to the low fertility regions of Bangladesh, and explanations that are offered for the difference tend to rely on the 'black box' cultural explanation (see Cleland et al. 1994:139-40; Mannan & Beaujot 2006:57), any attempt to engage with the research problem through a comparison of Chittagong with a low fertility region such as Khulna in order to identify the reasons for the disjuncture would find itself largely bereft of theoretical guidance.

Such an investigation would most likely proceed on the basis that there is an identifiable explanation for why couples in the relevant populations of interest in these two regions differ with one another in terms of the frequency and distribution of pre-transitional and post-transitional couples and with the implicit assumption that the factors or circumstances for the more substantial fertility declines in Kulna are transferable to Chittagong. Mason (1997) however points out that there is no single theory capable of providing a universal explanation for fertility decline. Such a comparison would also have to rely on the assumption that the two contexts and the couples within them are sufficiently similar to enable a meaningful comparison. However the key reason that socioeconomic explanations fail to explain Chittagong's continuing relatively high fertility is because Chittagong has experienced substantially greater socioeconomic development when compared to low fertility regions such as Khulna (see Caldwell et al. 1999; Islam et al. 2010:716), and the key reason that ideational and family planning innovation theories fail to provide an explanation for Chittagong's continuing relatively high fertility, beyond the 'black box' cultural explanation, is because differences in the implementation of the family planning programme across the high and low fertility regions are considered too minor in relation to their sharp differences in fertility outcomes (see Cleland et al. 1994:138-140; Mannan & Beaujot 2006:57). Whilst it could be suggested that the urban poor in

[1] See section 5.4.4 in Chapter 5 for further details on the conceptualisation and operationalisation of the dependent outcome of the study, the Fertility Outcome.

both contexts might be sufficiently similar to warrant a comparison, Islam & Nesa (2009:199) note from their examination of TFR by educational attainment and background characteristics across Bangladesh using data from the BDHS 2004 that women classified as belonging to the lowest education category of "illiterate" and living in Khulna had a lower TFR of 3.1 when compared to women in Chittagong classified as belonging to the highest education category of "secondary and higher" who had a TFR of 3.3. Chittagong therefore clearly exhibits a different socioeconomic, family planning and fertility dynamic and context to that of Khulna with the implication that the couples, even with comparable socioeconomic and background characteristics, are also highly likely to be different in these two regions with regards to issues of relevance to fertility. For this reason it appears more appropriate to address the research problem of high fertility in Chittagong more directly through an investigation that is specific to the couples and context of Chittagong.

The way forward therefore appears to lie in the examination and comparison of two distinct types of couples inhabiting the urban slums of Chittagong: the pre-transitional couple defined by their high level of fertility at ≥ 4 living children and the post-transitional couple with markedly lower fertility at ≤ 2 living children. Such a comparison and the resulting explanation for the differences in fertility of these two types of couple is expected to provide valuable insight as to how family planning programmatic interventions can best be designed and implemented over the coming decades to effectively lower fertility in the population of interest.

Depending on the nature of the resulting explanation for the differing fertility outcomes of pre-transitional and post-transitional couples, such an explanation might be limited in its contributions to the possible identification of *which* current or planned programmatic efforts are unlikely to facilitate a reduction in the fertility of couples and/or *what* change/s in circumstances would be likely to facilitate a reduction in the fertility of couples, rather than additionally contributing to the possible identification of *how* such change/s might effectively be brought about. The critical issue is first to be able to furnish an explanation for differences in the fertility outcomes of pre-transitional and post-transitional couples in order to move beyond the existing 'black box' cultural explanation.

The aim of the study therefore is to develop an explanation for why some couples within the urban poor of Chittagong have a low fertility outcome of ≤ 2 children whilst other very similar couples have high fertility outcome of ≥ 4 children, in order to inform family planning policy and programmatic interventions targeting this group.

1.6 - Overview of Study Organisation

Before turning to Chapter 2, because the study develops rather than adopts a particular methodological approach, it is considered appropriate first to provide a brief overview of the chapters to familiarise the reader with the essential structure of the study as well as key features in relation to methodology and results.

Chapter 2 provides a theoretical overview to introduce the relevant frameworks and theories of fertility, the nature of which inform methodological considerations in Chapter 3. The theories differ with regards to whether high fertility is subject to rational calculation, who within the couple undertakes fertility decision making and as to the posited mechanisms that link distal determinants to fertility outcomes. The implication for methodology is the requirement to investigate the situations, motivations, preferences and decisions of the individuals that make up couples, and how these relate and compare to that of one another, as part of an overall shift away from reliance on assumptions as to what motivates fertility decisions and for whom towards an empirical investigation of these issues. The RWA framework as elaborated by Lesthaeghe & Vanderhoeft (2001) is considered the appropriate theoretical framework for managing the complexity of analysing fertility decision making and the translation of such decisions into fertility outcomes through the examination of mechanisms.

Chapter 3 which focuses on issues of methodology contains a number of sections, the key points of which are outlined below.

First, the chapter begins by examining preliminary methodological considerations, constraints and limitations. The development of an explanation for differing fertility outcomes within the urban poor of Chittagong requires a methodological approach which offers the potential to examine demographic phenomena in sufficient depth to

enable discrimination between rival theories of fertility that fundamentally differ with one another in terms of their assumptions as to the mechanisms that lie between major determinants and fertility outcomes. Depth of explanation is therefore prioritised over generalisability. Because the researcher is unable to speak the Bengali language, the depth-focused small-N approach to be adopted or developed has to be more inclined towards deductive theory testing, objectivity and a structured design and process.

Second, the research questions of the study are defined and the methodological responses they require are examined. The first research question is defined as: What are the major determinants and underlying causal mechanisms of differing fertility outcomes within the urban poor of Chittagong? The delivery of such a causal explanation has the potential to inform family planning programmatic interventions. Because virtually all theories of fertility are ultimately reliant on micro-foundational assumptions as to what happens at the level of the individual, couple, family or household, and because differing fertility outcomes require investigating, this question calls for the employment of a theory driven in-depth within-case investigation of instances combined with their cross-case comparison through a small-N investigation, which carries with it the key challenge of how best to generalise any explanation developed. This question requires a methodological response capable of managing a mix of comparative counterfactual analysis, rival theory elimination, disaggregation or case-type analysis, combinatorial factor analysis, and process tracing. The second research question is formulated as: How likely will family planning programmatic interventions succeed in reducing the fertility outcomes of the urban poor in Chittagong? This research problem requires a methodological response which assesses the plausibility of the prospects of the family planning programme for achieving its intended outcomes. Because the response developed for the first research question is expected to contribute towards developing the response for the second research question, and requires the small-N within-case investigation of instances combined with their cross-case comparison, it is necessary to examine within-case methods and the structured form of cross-case methods known as comparative methods.

The third section of Chapter 3 therefore provides an overview of the employment of case methods in the discipline of economics and the social sciences generally followed

by an overview of the two dominant small-N comparative methods, Mill's inductive methods and Qualitative Comparative Analysis (QCA), which serves to identify the methodological way forward by highlighting the necessity of conducting a detailed comparison of QCA vis-à-vis Mill (1882).

In the fourth section of Chapter 3, it is found that QCA has a range of methodological limitations in addition to serious inconsistencies of causal assumption and that, despite the claims of advocates, QCA actually proceeds with what is in essence a retrogressed version of Mill's (1882) least methodologically capable inductive method. This section is necessarily detailed and serves to highlight principles of methodology which will later inform the foundations of the new approach to be developed.

The fifth section of chapter 3 provides an overview of Mill's (1882) rejection of the inductive methods for the study of social phenomena based on the incompatibility of the inductive methods with investigations into social phenomena which Mill (1882) views as characterised in causality by a notion of causation he refers to as the Composition of Causes. An examination of the principle approaches that are in Mill's (1882) view appropriate for the study of social phenomena, the Deductive Method and its cousin the Hypothetical Method, highlights his neglect of formulating the Hypothetical Method in relation to the investigation of mechanisms.

The final section of Chapter 3 then formulates a new comparative approach labelled Counterfactual Mechanism Analysis, which adopts Mill's (1882) Composition of Causes as its underlying causal notional template and proceeds with an integration of Mill's counterfactually based methods now specifically applied to the study of mechanisms. In addition to presenting the appearance of satisfying the methodological requirements for the development of a response to the first research question of the study, additional key features and advantages are highlighted, in particular the potential of CMA for integration with quantitative approaches due to the compatibility of its adopted notion of causation with probabilistic notions and due to common alignments of focus on counterfactual causation as well as mechanisms. The major limitation in CMA of being dependent on prior knowledge and the inability therefore of discovering the unspecified is offset by the ability to identify points of departure for

more inductive exploratory and unstructured approaches which typically rest in the qualitative tradition.

Chapter 4 provides an overview of the theoretical framework and the fieldwork related research methods employed in gathering data in preparation for Chapter 5 which provides the testing ground for the first application of CMA and in which the focus is on the production of a counterfactually based context specific conceptualisation and operationalisation of the conditions (variables) in each model of the framework.

Chapter 6, with its focus trained on conducting analyses and producing results, then utilises the output of Chapter 5 for the development and delivery of responses to both research questions of the study. The result delivered to the first research question suggests that for some couples within the population of interest, the influence of social norms is paramount both in the formulation of fertility preferences and for the actualisation of these preferences through a willingness to limit fertility and use modern contraceptive methods to do so, and additionally that the subjective cost of contraceptive methods also plays a role. Whilst this Social Norms explanation does appear, on the basis of patterns exhibited in secondary data, to be relevant to the population of interest beyond the couples examined in the small-N investigation, an assessment as to the proportion of the population of interest to which the explanation potentially applies is defeated by an insufficient number of appropriate couples exhibited in secondary data to allow for credible inferences in this regard. As such, whilst in the development and delivery of the response to the second research question of the study, a comparison 'in principle' between the Social Norms explanation against the family planning programme theory is undertaken with the support of national trends exhibited in data, it is ultimately on the basis of the plausibility of the underlying rationale and highly questionable foundations upon which priority setting has occurred within the programme theory itself that delivers the conclusion that interventions in their current form are unlikely to succeed in reducing fertility in the population of interest. Recommendations then point to specific areas of apparent promise which require further assessment through appropriately focused evidence gathering and further research.

Chapter 7 then concludes the study.

Chapter 2. Theoretical Overview

This chapter provides a brief overview of selected frameworks and theories upon which the theoretical framework and models in this study are based. The overarching theoretical framework which organises all the models in this study is that of the Ready, Willing and Able (RWA) framework as elaborated by Lesthaeghe & Vanderhoeft (2001). Accordingly, the theoretical overview is presented in relation to the RWA framework with a view to providing the reader with an early familiarisation of the framework and how the various theoretical models organised within it relate to one another. The relevant theories are examined in much greater depth as part of the conceptualisation and operationalisation process in chapter 5. At the end of this chapter, the implications that the theories present for methodology are highlighted in preparation for the chapter 3 which examines issues of methodology.

2.1 - The Ready, Willing and Able Theoretical Framework

Lesthaeghe & Vanderhoeft (2001) elaborate Coale's (1973) Readiness, Willingness and Ability preconditions for limiting fertility into what is essentially a set theoretic framework for the analysis of the adaptation of populations to new behaviours in fertility transitions.

The condition of Readiness refers to the notion that the benefits to be derived from the adoption of new behaviours such as limiting fertility are apparent to actors, and aligns to the classic cost-benefit calculus of microeconomics (Lesthaeghe & Vanderhoeft 2001:240, 242). As such, Readiness has been discussed and conceptually modelled extensively in the economic literature examining demographic outcome variables (Lesthaeghe & Vanderhoeft 2001:242).

The condition Willingness refers to considerations of legitimacy and the normative acceptability of the new behaviour, the evaluation of which takes place against the backdrop of internalised traditional beliefs, codes of conduct, moral sensibilities and fears (Lesthaeghe & Vanderhoeft 2001:240-241). In contrast to Readiness, Willingness has received far less attention in studies of fertility transitions mainly due to the assumption that once the Readiness to limit fertility is established, Willingness

automatically flows from this without moral or cultural impediment (Lesthaeghe & Vanderhoeft 2001:244).

The condition Ability refers to the accessibility of contraceptive techniques and includes costs, which can act to limit accessibility (Lesthaeghe & Vanderhoeft 2001:241). Ability has been the subject of ample attention, mainly in the family planning literature (Lesthaeghe & Vanderhoeft 2001:244).

Lesthaeghe & Vanderhoeft (2001:242) argue that in Coale's (1973) formulation of the RWA framework and its application in summarising the findings of the Princeton European Fertility Transitions Project, it was the combination of all three conditions together which was relevant to the onset and speed of the European fertility transitions, but that the findings of the project were denigrated by others into an economics (R) versus culture (W) debate, a misinterpretation that continues to this day.

For Lesthaeghe & Vanderhoeft (2001:262) therefore the reintroduction of the RWA framework yields the potential advantage that it allows the integration of the economic and non-economic paradigms, a crucial requirement for the study of fertility transitions, it bypasses 'dead-end streets' such as the economics versus culture debate, and it serves to highlight the fact that transitions can take many forms.

2.2 - The Classical Theory of Demographic Transition

At the end of WWII scholars at Princeton initiated a discussion about demographic developments in the U.S. and by doing so transferred the focus of what later became known as the classical theory of demographic transition from Europe to the U.S. (van de Kaa 1996:398). Building on Thompson's (1929) model of modern demographic change, Notestein (1945) formulated the theory in its most explicit and comprehensive form (Caldwell 1976:323; Kreager 2009:2; van de Kaa 1996:399).

According to the theory, western modernised countries in their pre-transitional stage experienced high mortality rates characterised by an array of institutional, religious and customary practices, property systems, habits and codes of morality that, whilst different across different societies, all acted to promote norms of early marriage and

high levels of fertility essential to the ongoing continuance and reproduction of the group (Notestein (1945) cited in Caldwell 1976:323; Notestein 1953). With increasing industrialisation and urbanisation, lower levels of mortality were, after a period of lag, followed by a range of institutional changes:

"Eventually the same science and technology that brought the reduction of mortality also transformed life in ways that were highly subversive to the institutions of the traditional society." (Notestein 1983:350).

These changes included less concern with personal ancestry and more concern with personal accomplishment, the functional diminishment of the extended family and increasing secularism (Notestein 1983:350). Parents increasingly shifted their focus away from adhering to traditional norms towards providing opportunities for their children's education, health and advancement which acted to adjust their motives and preferences in relation to desired family size (Notestein 1983:350).

Before fertility started to decline in response to modernisation and the associated lower mortality rates however, there was a period during which traditional behaviour continued:

"These institutions, customs, attitudes and beliefs are deeply rooted in long traditions. They represent the moral code, the normative order, which provides the non-rational cement of loyalty that binds individuals into groups and binds the past to the present. Virtually by the definition of a viable society they are slow to change." (Notestein 1983:350).

Rationality in human thought and behaviour is associated with, and viewed as a consequence of, changing material conditions associated with urban industrialisation (Notestein 1945, 1983).

When viewed in terms of the RWA framework, the classical theory of demographic transition posits that declines in mortality acted to develop in couples the Readiness to limit fertility but their Willingness to do so was initially impeded by traditional customs and normative attitudes and beliefs which were slow to change. Once Willingness also adjusted, couples where in a position to start limiting their fertility.

Whilst couples initially limited their fertility through the use of folk methods "that had been widely known but little used throughout the world for thousands of years" (Notestein 1983:350) and resulted in declining birth rates across almost all of Europe by the end of the 19th century, more widespread demand for effective and acceptable contraceptive methods spurred the development and use of new contraceptive methods which acted to further accelerate the decline of birth rates (Notestein 1983:350).

In emphasising that the "Reduction of birth rates requires changes of both means and motives" (Notestein 1983:350), the classical theory of demographic transition also then incorporates the notion of the Ability to limit fertility.

The classical theory of demographic transition thus appropriately illustrates the principles as well as the utility of the RWA framework in the analysis of fertility transitions.

In summary the classical theory of demographic transition views the reduction of fertility in countries across the modernised western world as having been comprised of four stages, each of which can be presented analytically in terms of the RWA framework: the first stage in which societies were characterised by both high mortality rates and high fertility rates and when neither Readiness, Willingness nor Ability to limit fertility were present; the second stage when mortality started to fall but fertility remained high and resulted in the growth of the overall population level during which the Readiness to limit fertility developed whilst Willingness lagged; a third stage in which fertility then started to decline, characterised by the presence of both the Readiness and Willingness to limit fertility but with Ability still limited due to reliance on relatively traditional contraceptive methods; and the final stage where both mortality and fertility settled at balanced low levels with zero population growth rate with the combined presence of the Readiness, Willingness and Ability to limit fertility.[2]

[2] It may be noted that later in this study the classical theory of demographic transition is not treated as a separate model but is instead 'distributed' across different models – in Model 2: Security Assets in an extended form including indicators related to perceived mortality risk as well as a range of other related indicators under the broad concept 'Security of Health' and in Model 4: Family Planning as part of the concept of Willingness. Because the theory views high fertility as arising from irrationality it has limited potential for informing programmatic interventions. Because each additional model to be examined adds to the complexity of case selection (see Chapter 3, section: The Formulation of Counterfactual

2.3 - Intergenerational Wealth Flows

In the theory of intergenerational wealth flows, flows of wealth are conceptualised to incorporate material and non-material aspects of intergenerational flows including economic, social and political well-being (Caldwell 1976, 1978, 1982).

Pre-transitional patriarchal societies are characterised by a net upward flow of wealth from younger to older generations whilst in modern societies the net flow is downwards (Caldwell 1978:553). Fertility decisions are based on rational calculation which, according to the theory, also takes place in pre-transitional societies where high levels of fertility occur because a larger number of surviving children contribute to a greater net upward intergenerational flow of wealth, in contrast to post-transitional societies where fertility decisions are based on the desire to minimise downward wealth flows from parents to children, subject to a minimum socially and psychologically acceptable number of children (Caldwell 1978:553). In pre-transitional families, it is older patriarch males in particular who enjoy the benefits of high fertility due to the unequal distribution of resources and services within the family (Caldwell 1976:343), and exercise decision making power with regards to the fertility of the younger generation (Caldwell 1978:566). In terms of the RWA framework therefore, in pre-transitional families the conjugal couple does not exercise decision making authority over their own fertility, and the older patriarch males who do exercise this authority have strong motivations that conflict with any latent Readiness to limit fertility that couples in the extended family might have.

The spread of formal education, mass media and the development of labour markets play important roles in reversing the direction of wealth flows and thus reducing fertility (Caldwell 1976, 1978, 1982). Mass formal education and mass media promote the ideological adoption of western values that emphasise and prioritise the nuclear family unit over the extended family thereby emotionally nucleating the conjugal couple from the extended family, and expanded employment opportunities with complete strangers (rather than family) enables the economic nucleation of the conjugal couple, allowing them decision making authority over their own family economy, and with it, decision making authority over their own fertility (Caldwell

Mechanism Analysis, sub-section: Rival theory instance selection and arbitration), a separate model based on the theory was considered unjustified when it could be integrated into other models.

1976:346, 352-344, 1978:568). Thus the combination of emotional nucleation and economic nucleation acts to alter the magnitude and direction of intergenerational wealth flows, or the net balance of intergenerational wealth flows, and so eliminates the rational motivation for high fertility (Caldwell 1976:344, 355, 1978:553). In terms of the RWA framework, the emotionally and economically nucleated couple have incentives to limit downward wealth flows as well as decision making authority over their own fertility which results in their Readiness to limit fertility.

2.4 - Children as Security Assets

Cain (1982:168) acknowledges the significance of intra-family member conflicts of interest and inequality as focused on by Caldwell (1976, 1978) in the intergenerational wealth flows theory but argues that even in the presence of hierarchical family structures, family members continue to share many interests and concerns.

For Cain (1978, 1981, 1982) these shared interests and concerns relate primarily to the value of children as security assets, a form of insurance against environmentally and socially determined risks the family faces.

Cain (1978:426) argues that in contexts characterised by low levels of environmental security, whether a crisis event is peculiar to the family such as the patriarch suffering a prolonged illness, or whether it commonly affects everyone in the vicinity as with floods, a family with mature sons faces a reduced risk of economic decline when compared to a family with no sons. Also, in settings with low levels of political and administrative development lacking the effective 'insurance' of the police, law and the courts against physical insecurity and the infringement of property rights, sons serve as security compliments to land or property and the income derived thereof (Cain 1981:453, 462, 1982:167, 1983:694-695). Therefore, in the absence of effective alternatives for the reduction of such risks there are powerful disincentives for both the husband and wife to adopt the use of contraception in order to limit their fertility (Cain 1978:427, 1981:467, 1982:160) and as such, interventions which focus narrowly on the widespread provision of contraception alone are unlikely to significantly reduce fertility (Cain 1978:437). In other words there are powerful disincentives for the couple

with regards to the development of their Readiness to limit fertility and efforts to develop their Ability to limit fertility alone are unlikely to result in lower fertility.

Cain, Khanam & Nahar (1979) however note that women face a special set of risks under patriarchy because men maintain power and control resources both within the family domain and in the public sphere to the extent that women are rendered powerless and highly dependent on them, both in terms of economic and physical security. Patriarchal risk therefore provides powerful systemic incentives to women for high fertility, especially in contexts such as Bangladesh in which the prospect of widowhood is typically a virtual certainty due to large differences in the age at marriage between men and women (Cain et al. 1979:409, 432-403). It is argued that under such circumstances "The best risk insurance for women.... is to produce sons, as many and as soon as possible" (Cain et al. 1979:433).

Therefore whilst Cain (1982:168-169) emphasises the shared security interests of the couple which act to align their fertility preferences, it is also noted that in contexts characterised by extreme levels of dependency by women on men, it is quite possible for women to hold preferences for higher fertility than men. The Readiness to limit fertility may therefore be even less developed for women than it is for men in such contexts.

2.5 - Marriage Bargaining Models

Whilst traditional neoclassical economists view the link between women's education and income earning opportunities to fertility as operating through the opportunity costs of women's time and the time cost of children, advocates of women's empowerment view the link as operating through the mechanism of women's decision making power within the family unit (Lundberg & Pollak 1996:140). Unlike traditional neoclassical common preference models which assume that a single joint family utility function is maximised through the appropriate distribution of pooled income by an altruistic family head (Becker 1981), marriage bargaining models recognise the possibility of both intra-household cooperation and conflict (Lundberg & Pollak 1993; Manser & Brown 1980; McElroy & Horney 1981). As such, marriage bargaining models are better equipped to inform issues of concern in population and international

development by offering the potential to examine the intra-household distribution of resources, welfare, and decision making authority, in contrast to traditional neoclassical models which analytically treat the household as a 'black box' into which income enters and from which the demand for goods, services, leisure and children emerges (Del Boca 1997:49; Lundberg & Pollak 1996:140).

The ‘threat point’ in separate spheres models refers to the utility of each individual under the circumstances of a breakdown in cooperation between spouses within a marriage that nevertheless continues (Lundberg & Pollak 1993), whilst the ‘threat point’ in divorce threat models refers to the utility attainable by each individual after divorce, with utility being mainly a function of income earned as a single person (Manser & Brown 1980; McElroy & Horney 1981). The distribution of bargaining power between spouses within marriage is assumed to be based on the relative economic position of each partner at the threat point, that is, the economic circumstances each would experience after a breakdown of cooperation within marriage or after a divorce (Lundberg & Pollak 1993; Manser & Brown 1980; McElroy & Horney 1981).

McElroy (1990:561) notes that environmental variables outside the marriage, ‘extra-household environmental parameters’, can shift the threat point and therefore the balance of bargaining power within marriage. Folbre (1997:265) suggests that many of these environmental variables are strongly gender specific and refers to such variables as ‘gender-specific environmental parameters’.

The idea that fertility is related to the bargaining power of women within marriage assumes that more empowered women will tend to have lower fertility. In a review of theory and evidence on differing fertility goals between men and women, Mason and Taj (1987) note that differences in the balance of child costs and benefits each partner perceives can arise because women face unique costs of bearing and rearing children due to physiological differences in the role of reproduction, as well as from socially induced and gender based differences in the division of labour. When the gendered division of labour is minimal, men and women will have similar social and economic interests and therefore similar fertility preferences (Mason & Taj 1987:614). Folbre (1983) argues that high fertility rates arise as a result of the constraints women face in exercising their reproductive preferences in patriarchal contexts which inherently

favour higher fertility. Amin and Lloyd (2002:3) note that for many years the general consensus in the international population field has been that improvements in the status or position of women relative to that of men is a critical, perhaps even a necessary, condition for significant fertility declines to take place in patriarchal and relatively poor contexts in the developing world. Similarly, Basu (2002:1779) notes that the literature examining fertility decline in the developing world exhibits an almost unanimous consensus that the two strongest influencing factors of reduced fertility at the individual and community level are increasing women's status incorporating some notion of gender equality and the increasing educational attainment of women who become mothers. A consensus on the underlying mechanisms behind the near universal negative relationship between education and fertility has however remained elusive, but has resulted in the hypothesis that education reduces fertility via its impact on gender equality (Basu 2002:1779).

The key assumption underlying much of the literature that examines the relationship between women's empowerment and fertility, which appears to be implicitly based on the concept of sex differentiated parental investment in offspring as articulated in parental investment theory from the field of evolutionary biology (see Trivers 1972), is that women inherently prefer to have fewer children than men because women bear disproportionate costs in relation to child-bearing and child-rearing, and once empowered are more able to assert their latent preference for low fertility. What this suggests in terms of the RWA framework is that whilst the preference to limit fertility is present in a latent possibly unobservable form amongst disempowered women, when women are more empowered and therefore more ready to assert their inherent preference to limit fertility, this will translate to their Readiness to limit fertility.

2.6 - Social Norms and Fertility

Mason & Taj (1987:618) argue that even where gender-based divisions of labour and power are extreme, personal welfare might be viewed as resting more on family welfare than on the circumstances that are peculiar to each sex thereby inducing men and women to form very similar fertility goals, and that tradition or socialisation might have a similar result: community norms in relation to the desirability of a certain

number of children or sons, or fertility control, may induce men and women to have similar fertility goals because their individual goals have been shaped and formed by the same values and norms. Social norms may therefore have a similar influence on both men and women in terms of their Readiness and Willingness to limit fertility.

Blake (1968) asserts that social norms influence the formulation of preferences not only for the quantity of children but also the 'quality' of children. Not only are 'tastes' in children subject to social influence but there are normative prescriptions to produce children whose behaviour remains within the law and provide them with education, with standards of child 'quality' becoming increasingly demanding as one goes up the social scale (Blake 1968:18-20). Thus more affluent parents are motivated to invest increasing amounts to 'produce' higher ‘quality’ children because they feel obligated to provide their children with the competitive advantages of their class (Blake 1968:18-20). This type of child 'quality' motivation, shaped by social norms, might then place further downward pressure on demand for the quantity of children. More affluent parents therefore who, under the influence of social norms, place greater emphasis on child ‘quality’ might likely develop higher levels of Readiness to limit fertility.

Montgomery & Casterline (1996) distinguish between the concepts of social influence and social learning, both of which have social effects on individual behaviour. Social influence primarily has effects on individuals through the individual’s motivation to avoid social conflict (Montgomery & Casterline 1996:155). Social learning has social effects because individuals often make decisions under situations of uncertainty and will draw information from a range of sources to reduce uncertainties and to clarify the costs and benefits of their private decisions (Montgomery & Casterline 1996:153).

Montgomery & Casterline (1996:159-160) argue with regards to the child quantity-quality trade-off that parents in at least the early stages of a fertility transition must be uncertain about the expected benefits of educating their children due to the large direct and opportunity costs of schooling and the uncertain returns only potentially realisable many years into the future, and ask how else are parents under such circumstances to formulate decisions, if not through social learning?. For similar reasons, in the absence of peers who use modern contraception or having observed negative side effects amongst those who do, an individual who is predisposed to using

modern contraception might not do so (Casterline 2001:14). Under situations of uncertainty in relation to expected benefits and costs in fertility and contraceptive decision making therefore social learning can potentially have a substantial effect in the formulation of both the Readiness and Willingness to limit fertility.

The possible influence of social norms on the formulation of the Readiness and Willingness to limit fertility therefore reaches far beyond the notion of people simply mimicking each other in terms of the number of children they have, and includes notions about how important changes in factors and opportunities relevant to fertility decision making are interpreted and responded to under uncertainty.

2.7 - Ideational & Family Planning Models

Easterlin (1975) argues that "Although motivation is a necessary condition for fertility regulation, it is not a sufficient condition" (Easterlin 1975:56). Fertility regulation imposes psychic costs in the form of the displeasure associated with the idea or practice of controlling fertility and market costs in the form of the time and money spent in order to learn about and adopt the use of specific techniques (Easterlin 1975:56). In turn these costs are determined by general attitudes in society towards the notion of fertility control and the use of specific techniques to achieve this, as well as the accessibility of fertility control in terms of the availability of information, the variety of techniques and their prices (Easterlin 1975:56). Family planning programmes usually aim to lower psychic costs through efforts to lend legitimacy to the idea of fertility control and lower market costs through the provision of information and free or subsidised services and contraceptive commodities (Easterlin 1975:56). As such, family planning programmes focus on developing the Willingness and Ability of couples to limit fertility.

From the 1970s the Bangladesh family planning programme through its information, motivation and communication activities has engaged in an intensive campaign to promote the adoption of family planning (Cleland et al. 1994:82).

Cleland et al. (1994:82, 121) argue that although one aspect of the programme focused on the promotion of the message, through the media, programme fieldworkers and

N.G.O fieldworkers, that limiting family size would increase family well-being, and so was geared towards the modification of the demand for children, that latent demand for reduced fertility already existed in Bangladesh due to reductions in mortality and the corresponding increase in child survival.[3] In other words, the Readiness to limit fertility amongst couples in Bangladesh was already largely present due to declines in mortality.

Couples in Bangladesh wanted to limit their fertility but were not doing so because the costs of contraception were excessive, with costs broadly defined to include not only the direct monetary costs of commodities and services but also indirect costs such travel costs, the opportunity cost of time involved in their acquisition, subjective social, familial and personal costs, and subjective and objective concerns about the implications of contraceptive use for health (Cleland et al. 1994:84-85, 103). The fertility of couples in Bangladesh remained high therefore because even though the Readiness to limit fertility was largely present, the Willingness and Ability to limit fertility were largely absent.

The central aim of the Bangladesh programme was therefore to mitigate these costs of fertility regulation (Cleland et al. 1994:103) through the key strategy of providing convenient and subsidised family planning services (Cleland et al. 1994:85), including free clinical services or commercial sales through conveniently located outlets and outreach services provided nationwide by almost 30,000 fieldworkers (Cleland et al. 1994:103, 115). Outreach in Bangladesh went beyond the simple supply of contraceptives, and addressed the social and psychological costs of contraception by providing the otherwise lacking social support for contraception (Cleland et al. 1994:115). These efforts were geared therefore towards addressing the Willingness and Ability to limit fertility directly at the level of the individual. Mass communication and extensive publicity also aimed to legitimise family planning practise and counter familial constraints (Cleland et al. 1994:115, 124), and was therefore geared more broadly towards reducing social and familial obstacles and influences which might otherwise impede the programme's efforts to develop the Willingness and Ability to limit fertility at the level of the individual.

[3] It may be noted the assertion by Cleland et al. (1994) that latent demand for reduced fertility already existed due to reductions in mortality and the corresponding increase in child survival is consistent with the classical theory of demographic transition (see Notestein 1945, 1983).

Cleland et al. (1994:81-83, 121, 134) therefore reject the thesis that socioeconomic or structural factors were the major drivers of the fertility decline in Bangladesh, and conclude that whilst most theories of fertility decline accord theoretical primacy to changes in the demand for children in response to changes in socioeconomic conditions and treat supply side factors such as the acceptability and access to contraception as being contingent upon, and subordinate to, demand factors, that evidence for the fertility decline in Bangladesh suggests the relative importance and primacy of supply side factors. In terms of the RWA framework therefore, fertility was reduced in Bangladesh due to the family planning programme's successful efforts to develop the Willingness and Ability to limit fertility rather than through developing the Readiness to limit fertility which was already largely present.

2.8 - The Proximate Determinants of Fertility

Davis and Blake (1956:234) argue that the hypothesis that pre-industrial high-mortality societies were characterised by socio-cultural institutions which acted to drive sufficiently high levels of fertility to ensure the ongoing survival of the group (see Notestein 1945, 1983) is presented at too high a level of abstraction to fruitfully enable the analysis of the effects of institutional factors on fertility, and suggest a framework of 11 intermediate factors as a means to distinguish the various mechanisms through which any socio-cultural factor can influence fertility. These intermediate factors are argued to be "those through which, and only through which, cultural conditions can affect fertility" (Davis & Blake 1956:211, original emphasis).

Bongaarts (1978, 1982) further develops this framework by ultimately reducing the number of proximate determinants to 7 in total and grouping them into three categories:

1) Exposure Factors
    a) Proportion of women who are married. Reproduction is assumed to primarily take place in marriage, broadly defined to include consensual unions.

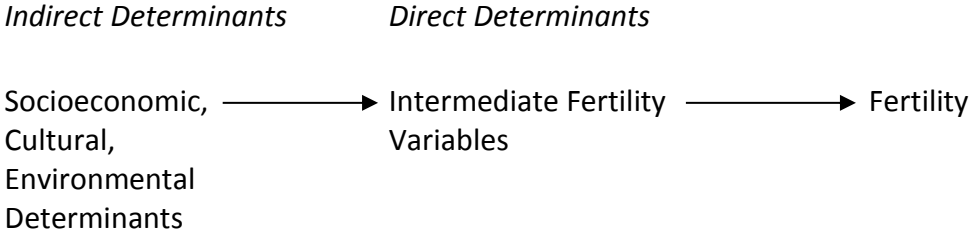
2) Deliberate Marital Fertility Control Factors
    a) Contraception. The utilisation and effectiveness of contraception will affect fertility.
    b) Induced abortion

3) Natural Marital Fertility Control Factors
    a) Duration of postpartum infecundability. This is the period after giving birth during which a woman is usually incapable of conceiving, overwhelmingly determined by the duration of postpartum amenorrhea (no ovulation occurs) which in turn is determined mainly by the duration and intensity of breastfeeding.
    b) Frequency of intercourse. This might be influenced by the migration of men seeking employment and a range of other factors.
    c) Prevalence of permanent sterility. This refers to the physiological inability to bear children, usually the age at which female menopause takes place.
    d) Spontaneous intrauterine mortality

The proximate determinants framework suggests that distal determinants, such as socioeconomic, cultural or environmental factors can only affect fertility indirectly by causing changes in the behavioural and biological proximate determinants of fertility:

Figure 2.1

The Proximate Determinants of Fertility Framework



Source: Bongaarts 1978:106

Bongaarts (1978:105) argues that the primary characteristic of an intermediate fertility variable is the direct and predictable link it has to fertility: a change in the prevalence of contraception for example has a predictable effect on fertility provided other intermediate fertility variables remain unchanged, whilst the effects of distal determinants such as education or income on fertility are not as predictable.

Bongaarts (1978:125) also points out that the proximate determinants framework can be used in the comparative analysis of fertility differentials among populations or among subgroups within a particular population to identify the relevant intermediate fertility variables, and therefore may be particularly useful for identifying the pathways through which various socioeconomic determinants affect fertility.

Of the seven proximate determinants of fertility, four are identified as being principally responsible for fertility variation amongst populations: the proportion of women who are married, the duration of postpartum infecundability, the use and effectiveness of contraception and the prevalence of induced abortion (Bongaarts 1982:179-180).

The deliberate marital control factors of contraception and induced abortion in the proximate determinants framework are the intermediate variables most directly concerned with the implementation of couples' fertility choices and coincide with the RWA framework's Ability to limit fertility. Additionally, distal socioeconomic, cultural and environmental variables in the proximate determinants framework coincide with factors which could be viewed as influencing the Readiness and Willingness to limit fertility. The proximate determinants and RWA frameworks therefore appear to be highly compatible and complimentary to one another in the analysis of fertility.

When viewed through the lens of the proximate determinants framework, programmatic efforts to increase the Ability to limit fertility, for example through the widespread provision of subsidised or free contraception, given the existing presence of both the Readiness and the Willingness to limit fertility would tend to have highly predictable results in terms of fertility outcomes, whereas efforts to develop Readiness and/or Willingness to limit fertility, even given the presence of the Ability to limit fertility, would not have the advantage of such predictability.

2.9 - Implications for Methodology

The overview of the theories of fertility in this chapter highlights several important considerations and one critical implication for methodology which are now discussed.

First, the theories discussed differ as to whether high fertility is subject to rational calculation.

The classical theory of demographic transition for example posits that high fertility is a consequence of non-rational adherence to social norms and traditions which promote high fertility and it is only with urban industrialisation that rational fertility decision making starts to occur and ultimately results in low fertility (Notestein 1945, 1983). Other theories such as the intergenerational wealth flows theory (Caldwell 1976, 1978, 1982) and the children as security assets theory (Cain 1978, 1981, 1982) posit that high fertility occurs in pre-transitional contexts specifically because the benefits of high fertility substantially outweigh the costs for the relevant fertility decision makers.

Second, there are theoretical distinctions as to who undertakes fertility decision making both within the theories themselves depending on the circumstances, as well as across the different theories.

The intergenerational wealth flows theory posits that decision making in the favour of high fertility is exercised by older patriarch males in the pre-transitional context whilst it is undertaken by the couple in favour of low fertility in the post-transitional context (Caldwell 1976, 1978, 1982). In the children as security assets theory it is the couple who jointly make fertility decisions in the favour of high fertility as well as low fertility (Cain 1978, 1981, 1982). In marriage bargaining and women's empowerment theories, in pre-transitional patriarchal contexts it is the husband who exercises fertility decision making in favour of high fertility whilst in post-transitional contexts the relatively more empowered and economically assertive wife enjoys the alignment of her husband's fertility preferences with her own inherent preference for low fertility (Folbre 1983). With regards to the effects of social norms on fertility, Mason & Taj (1987:618) note the possibility that in pre-transitional contexts social norms might shape the formulation of similar fertility preferences amongst men and women to such an extent

that their fertility preferences align more closely than they might in post-transitional modernised contexts.

Third, whilst theories of fertility posit distal determinants which can be viewed as particular aspects or characteristics of socioeconomic development, they differ from each other primarily in terms of the posited mechanisms that link these distal determinants to fertility outcomes.[4]

Whilst both the intergenerational wealth flows theory and the children as security assets theory view high fertility as arising from patriarchal influences, they differ fundamentally as to assumptions of the motivations that drive high fertility – in the former it is motivations focused on increasing upward wealth flows (Caldwell 1976, 1978, 1982) whilst for the latter it is motivations focused on increasing security and the mitigation of risk (Cain 1978, 1981, 1982). Similarly, whilst the classical theory of demographic transition posits that social norms in pre-transitional contexts act to promote high fertility, and the influence of social norms gives way to rational fertility calculation in post-transitional socio-economically developed contexts (Notestein 1945, 1983), social norms theories in contrast suggest that social norms influence the formulation of both child quantity and child 'quality' preferences so that as socioeconomic status increases, parents pursue ever increasing levels of child 'quality' (Blake 1968), which may in turn place further downward pressure on child quantity preferences.

The importance of examining mechanisms in the analysis of fertility is further highlighted by the proximate determinants framework which situates the use and effectiveness of contraception as a proximate and highly predictable determinant of fertility outcomes in a causal chain which stretches back from the fertility outcome towards the distal socio-economic, cultural and environmental determinants of fertility.

Overall, what the differences in these theories highlight in terms of implications for methodology, is the need to investigate the situations, motivations, preferences and decisions of the individuals that make up couples, and how these relate and compare

[4] De Bruijn (2006:550) argues that the classical theory of demographic transition offers a paradigmatic framework in which each theory of fertility can be viewed as a part of the total explanation of the generally observed trend from high to low fertility.

to that of one another. There needs to be an effort to move away from assumptions as to what motivates fertility decisions and who is motivated to make them towards an empirical investigation of these issues.

The RWA framework as elaborated by Lesthaeghe & Vanderhoeft (2001) appears to offer the appropriate overarching theoretical framework with which to manage the complexity of analysing fertility decision making and the translation of these decisions into fertility outcomes through the examination of mechanisms pertaining to the Readiness, Willingness and Ability to limit fertility.

Chapter 3. Methodology

This chapter is organised as follows: first, the chapter begins by examining preliminary methodological considerations, constraints and limitations; second, the research questions of the study are defined and the methodological responses they require are discussed; third, an overview of the employment of case methods in the discipline of economics and the social sciences is provided followed by an overview of the comparative methods which serve to identify the methodological way forward and highlight the necessity of conducting a detailed comparison of QCA vis-à-vis Mill (1882), which fourth, is conducted; fifth, an overview of Mill's (1882) rejection of the inductive methods for the study of social phenomena and the detail of his deductive and hypothetical methods are provided; finally, the formulation and exposition of a new comparative approach, Counterfactual Mechanism Analysis, takes place.

3.1 - Preliminary Methodological Considerations, Constraints and Limitations

The overall approach that characterises the development of the methodology in this study is inspired by the pragmatic emphasis on the adoption of problem-driven approaches rather than those based on researcher or discipline specific predispositions for particular paradigms or methods. Methodological development is therefore guided by the principle of "the dictatorship of the research question" (Tashakkori & Teddlie 1998:20).

The discipline of demography, described as "strong in accountancy, weak in conceptualisation" (De Bruijn 2006:549) and characterised in methodological inclination by the notion "if you can't measure it, it isn't important," (Greenhalgh 1996:48) has tended to emphasise quantification to the extent of earning the reputation in some quarters as a discipline with "all methods and no theory" (Greenhalgh 1996:48).

Greenhalgh (1996:44-48) argues that apart from the emphasis on technical sophistry and the resulting relegation of theory construction to a lower status pursuit in the discipline, the influence of the family planning agenda in the discipline of demography focused attention narrowly towards practical supply side factors of fertility related to

family planning programmes, to the neglect of whole classes of issues including people's own fertility preferences as well as contextual factors.

In the study of fertility, the relatively open spaces of theoretical substance have been subject to the attentions of other disciplines such as economics, sociology and anthropology, accompanied by their own perspectives, focus, methodology, levels of analysis and assumptions in relation to the mechanisms underlying fertility behaviour (De Bruijn 2006:550).

Given that fertility is a major area of focus in the discipline of demography but this advantage has not been sufficient to substantially propel theoretical development in this regard, and given that the technical sophistry of the discipline is yet to produce a consensus as to either the reasons for the overall decline of fertility in Bangladesh that has occurred over the last few decades or the reasons for sharp regional variations in fertility that continue to persist, the adoption in this study of similar methodological inclinations to that of demography in order to develop an understanding of fertility and related issues pertaining to the urban poor within Chittagong appears inappropriate.

De Bruijn (2006:549) asserts in relation to the one sided sophistry of data collection and mathematical analysis and the neglect of theory in demography, of the need to employ theories, conceptual frameworks and models that identify the underlying causal mechanisms of relationships between relevant variables in order to arrive at a "true understanding of demographic phenomena" (De Bruijn 2006:549).

This assertion however lends the impression that all quantitative approaches neglect the study of mechanisms. On the contrary, there are a range of quantitative approaches in which the study of mechanisms is central.

Social scientists generally consider the explication of mechanisms (also referred to as mediating or intervening variables) to better understanding how a cause affects an outcome as essential to sound explanatory practise in causal analysis (Glynn 2012:257; Morgan & Winship 2007:224).

A predominant quantitative strategy in testing for multiple causal mechanisms has been to employ linear structural equation models (Imai & Yamamoto 2013:141).

Applied researchers in a variety of disciplines including epidemiology, political science, sociology and psychology routinely employ the statistical framework of causal mediation analysis to study causal mechanisms (Imai, Keele & Yamamoto 2010:51-52; Imai & Yamamoto 2013:141). In econometrics one of the most powerful tools, considered a signature technique, is the instrumental variables method which can be applied to the study of mechanisms (Angrist & Krueger 2001:69; Angrist & Pischke 2009:114, 151). More generally, both the statistics and econometric traditions employ the counterfactual model for causal analysis referred to as the potential outcomes framework (Morgan & Winship 2007:4).

Whilst there are marked differences between the statistics and econometrics traditions, for example with regards to whether counterfactual models remain implicit (statistics) or are made explicit (econometrics) and in opinions regarding causal mediation analysis and instrumental variables methods surrounding appropriateness of assumptions adopted and manner of application (Glymour 2006:451-2; Heckman 2001; Heckman & Pinto 2013), both traditions are subject to a common challenge that is of particular relevance to the methodological direction of this study, that of the ability to generate sufficient depth of explanation.

With regards to literature emanating from the statistics tradition, Morgan & Winship (2007:242) note the possibility that even though the causal effect by a mechanism may be identified this might not provide a sufficiently deep explanation of the phenomenon of interest, which requires the mechanism's causal pathways to be articulated with sufficiently fine granularity to meet "whatever standard of bottoming out is maintained in the relevant field of study" (Morgan & Winship 2007:242). Similarly with regards to the application of econometrics in general, it is noted that "The information in any body of data is usually too weak to eliminate competing causal explanations of the same phenomenon" (Heckman 2000:91) and so "many models may explain the same data" (Heckman 2000:89).

A complete description of mechanisms incorporates descriptions of the relevant entities, properties and activities that link their initiating and terminal points to demonstrate how actions at one stage affect and effect those at successive stages –

there are no gaps that render specific steps in the causal chain unintelligible (Machamer, Darden & Craver 2000:12).

Although Gerring (2007:70) points out that any social scientific explanation involves the inclusion of assumptions with regards to "why people do what they do or think what they think, a matter of intentions and motivations" Gerring (2007:70), given that the theories of fertility to be examined in this study differ fundamentally with one another specifically with regards to this type of assumption, and there is a clear need to empirically investigate and assess these assumptions from the initiating formulation of fertility preferences all the way through to the fertility outcome, that is, in terms of mechanisms situated along the causal chain of fertility decision making and the enablement of these decisions to produce the fertility outcome, any gaps in this causal chain due to the absence of specified mechanisms will require the unwanted retention or adoption of assumptions to fill them.

Therefore an appropriately fine grained examination of mechanisms situated on such a causal chain, one which minimises gaps and assumptions, necessitates the empirical examination of a greater number of mechanisms, that is, variables or conditions.

Both single case study designs and small-N case oriented designs which focus on developing explanations of within-case causal processes offer the advantage of allowing the empirical examination of a larger number of variables than would normally be found in large-N quantitative studies (Cooper et al. 2012:15; George & Bennett 2005:21). Even when the examination of within case processes is not the major focus of study, as with X/Y focused comparative designs, the key difference between small-N and large-N studies "lies ultimately in the balance between number of variables and number of cases" (Caramani 2009:14).

Whilst the ability to examine a larger number of variables (and therefore mechanisms) lends a distinct advantage to small-N designs over large-N statistical or econometric designs with regards to the potential for reducing gaps in the causal chain and therefore reducing the assumptions required to fill the gaps, the number of variables to be examined is not the only consideration of relevance to the initial methodological direction of this study. The depth to which variables can be conceptualised is also of critical importance.

Variables are usually abstract concepts that cannot be directly observed but rather have to be operationalised through indicators specified at a lower level of abstraction (Blatter & Haverland 2012:21). Factor analysis and covariance structure models used in large-N quantitative studies proceed upon this principle (Collier, Brady & Seawright 2010:138).

Machamer et al. (2000:13) point out that nested hierarchical descriptions of mechanisms need to bottom out in the lowest levels of mechanisms, that is, in components accepted as relatively fundamental or unproblematic for a given scientist, research group or field such that "The explanation comes to an end, and description of lower-level mechanisms would be irrelevant to their interests" (Machamer et al. 2000:13).

Single case study designs and small-N case oriented designs are argued to offer relatively higher levels of conceptual validity through the detailed identification and measurement of indicators that best represent the concepts the researcher intends to measure when contrasted with large-N statistical designs (George & Bennett 2005:19) because other things being equal, the fewer the cases examined, the greater the information that can be collected about each of them (Hammersley & Gomm 2000:2). Similarly, Blatter & Haverland (2012:19) argue the key difference between small-N and large-N comparative designs is the small-N advantage of being able to take a much higher number of indicators into consideration when arriving at the score for each variable.

The relative advantage that single case study designs, small-N case oriented and small-N comparative designs have in contrast with large-N statistical or econometric designs, both in terms of the larger number of variables that can be examined and in terms of the greater depth with which these variables can be conceptualised using a larger number of fine grained indicators however carries with it a major disadvantage - the severely diminished generalisability of findings.

Gerring (2007:21) points out that the greater the number of cases examined, the less intensively each is studied, but the more confident we can be of their representativeness to some broader population. Mahoney (2008:413) distinguishes small-N and large-N designs by referring to them in terms of their goals of

generalisation – the primary concern in case oriented designs is with causation in the specific cases under examination whilst the primary concern in population oriented designs is to identify typical causal effects in overall populations. Similarly, Della Porta (2008:206) notes that in small-N case oriented designs generalisations are temporarily limited to the cases examined with the wider relevance of findings considered pending and subject to further research. Ultimately as noted by Collier et al. (2010:153), research involves trade-offs which may include conflicts among the goals to be pursued.

The overall aim of the study is to develop an explanation for why some couples within the urban poor of Chittagong have a low fertility outcome whilst other very similar couples have a high fertility outcome, in order to inform family planning programmatic interventions targeting this group.

Within this overall aim are two conflicting goals: on the one hand there is a need to develop an explanation for differences in the fertility outcomes of couples, requiring a detailed and in-depth investigation, but on the other hand there is a need to inform family planning programmatic interventions, requiring that any explanation developed relates to the wider population of interest where these interventions occur, that is, the findings should be generalisable.

This trade-off in research between developing in-depth explanations and producing generalisable findings is widely recognised:

“Whether to strive for breadth or depth is not a question that can be answered in any definitive way. All we can safely conclude is that researchers invariably face a choice between knowing more about less, or less about more” (Gerring 2007:49).

In deciding the appropriate balance between depth and breadth for the methodological direction of this study, and remembering that the RWA framework elaborated by Lesthaeghe & Vanderhoeft (2001) traces back to Coale’s (1973) formulation and its application in summarising the findings of the Princeton European Fertility Transitions Project, it is useful to consider De Bruijn’s (2006:560) assertion that although the Princeton Project identified culture as an important determinant of fertility, in the discipline of demography “Apart from the work of a small number of

researchers, culture has hardly gained any depth; it is usually only grasped in terms of language, ethnicity, or geographic region" (De Bruijn 2006:560). For De Bruijn (2006:560) large-scale surveys on which traditional demography relies are incapable of grasping the meaning of culture with the consequence that for many demographers culture has become a concept assumed to contain all residual explanation.

As previously discussed in relation to existing debates surrounding the continuing relatively high levels of fertility in Chittagong, it is through resort to this residual explanation, through the 'black box' cultural argument, that commentators explain away rather than explain the phenomenon of high fertility in Chittagong. It is precisely this 'black box' which needs to be opened and examined.

Bearing in mind De Bruijn's (2006:560) insistence that what is required for the design of effective family planning programme interventions is insight into individual behaviour formation and specific knowledge about the context of that behaviour, it appears that on balance the adoption of a small-N in-depth approach utilising carefully collected and processed fine grained primary data with a view to possibly enhancing the generalisability of any relevant findings beyond the cases examined to the wider population of interest through the examination of secondary data is the most appropriate methodological direction in which to proceed.

One practical challenge that presents itself immediately for the adoption of any such approach is the inability of the researcher to speak the Bengali language or any other dialects of Bangladesh, which necessitates the use of language interpreters to act as intermediaries in the flow of information, ideas and meanings between the researcher and subjects.

To expect that this flow would remain un-impacted and unmodified by interpretations, other than that of language, by the intermediaries is a highly unrealistic expectation.

Because of 'the language issue' therefore, the adoption of an inductive, subjective, interpretivist or constructivist approach appears inappropriate, and for this reason the approach has to be more inclined towards:

1) Deductive theory testing rather than inductive theory building

2) Objectivity rather than subjectivity

3) A structured rather than unstructured design and process

One key disadvantage of adopting such an approach is that it does not allow the possibility of developing insights into the phenomenon under investigation beyond what is already theoretically specified, and instead proceeds on the assumption that what is specified holds the key to the research problem, even though there may well be better explanations and insights that might otherwise be subject to discovery with a more inductive and less structured approach.

Nevertheless, having established the overall nature of the approach to be adopted, the research questions of the study can now be examined in order to formulate a more detailed specification of the methodological requirements of the study.

3.2 - The Methodological Responses Demanded by the Research Questions

The research problem presents two research questions, which are now discussed.

Q1. What are the major determinants and underlying causal mechanisms of differing fertility outcomes within the urban poor of Chittagong?

Seeking a causal explanation for, rather than a description of, differing fertility outcomes within the urban poor of Chittagong, requires the identification not only of the major determinants of fertility, but also the identification of the causal mechanisms, specified in terms of the RWA framework, that link these determinants to their fertility outcomes so as to arrive at an understanding of how the major determinants produce the fertility outcomes in a manner that can inform family planning programmatic interventions.

It may be recalled from the discussion on ideational and family planning models in chapter 2, that in terms of the RWA framework family planning programmes focus on developing the Willingness and Ability to limit fertility, rather than the Readiness to

limit fertility (see Easterlin 1975:56).[5] In relation to the overall decline of fertility in Bangladesh the family planning programme was typical in this sense in that its interventions proceeded on the basis that the Readiness to limit fertility amongst couples was largely present due to declines in mortality (see Cleland et al. 1994:82, 121), but the Willingness and Ability to limit fertility were largely absent and required development through programmatic interventions (see Cleland et al. 1994:84-85, 103). Fertility is therefore claimed by ideational and family planning model advocates to have declined in Bangladesh due to the family planning programme's successful efforts to develop the Willingness and Ability to limit fertility rather than through developing the Readiness to limit fertility which is considered to have been already largely present (see Cleland et al. 1994:81-83, 121, 134).

Whilst the Readiness to limit fertility lies beyond the traditional domain of family planning programmatic interventions, its examination is essential to the research problem in view of the fact that neither socioeconomic theories nor ideational and family planning models are able to explain the ongoing relatively high levels of fertility in Chittagong. An in-depth understanding of what constitutes the Readiness to limit fertility for couples in the given context (for example if some couples perceive it to be economically beneficial to have many children whilst others do not) might serve to inform broader developmental policy beyond the concerns of family planning or might suggest an expansion of the scope of family planning programmatic interventions into this domain.[6] The details of what constitutes the Willingness to limit fertility (for example if it is found to be based primarily on the degree of religiosity) and the Ability to limit fertility (for example if it is found to be based primarily on the affordability of contraception) would serve to inform family planning programmatic interventions as to which particular aspects to focus on in the design and implementation of

[5] To recap, Readiness to limit fertility refers to the notion that the benefits to be derived from the adoption of new behaviours such as limiting fertility are apparent to actors, and aligns to the classic cost-benefit calculus of microeconomics, Willingness to limit fertility refers to considerations of legitimacy and the normative acceptability of the new behaviour and Ability to limit fertility refers to the accessibility of contraceptive techniques and includes costs, which can act to limit accessibility (Lesthaeghe & Vanderhoeft 2001:240-242).

[6] It may be recalled from the discussion on ideational and family planning models in chapter 2 that in relation to the overall decline of fertility in Bangladesh although the core focus of the Bangladesh family planning programme was on the development of the Willingness and Ability to limit fertility, there was nonetheless a minor aspect of the programme which promoted the message that limiting family size would increase family well-being and so was geared towards the development of the Readiness to limit fertility (see Cleland et al. 1994:82, 121).

interventions geared towards the development of the Willingness and Ability to limit fertility.[7]

As such, the identification of the fertility outcome of couples is relatively straightforward and involves empirically examining how many living children any particular couple has.[8]

Identifying the major determinants and the causal mechanisms that produce differing fertility outcomes in this study, specified in terms of the RWA framework, necessarily involves the in-depth theory driven examination of the situations, motivations, preferences and decisions of the separate individuals that constitute a couple, and of the couple as a whole, in relation to desired fertility outcome, and how these decisions are enabled through choice of, access to, and the use of modern family planning methods so as to produce the desired fertility outcome.

Virtually all theories of fertility, even if they are primarily focused on variations or changes in aggregate fertility outcomes at the macro-level of analysis and view the source of variation or change in the fertility outcomes of couples as emanating from macro-level societal factors (for example the classical theory of demographic transition in Notestein (1945)), are ultimately reliant on micro-foundational assumptions as to what happens with regards to the situations, motivations, preferences, and the enablement of fertility related decisions at the level of the individual, couple, family or household.

For this reason all the theories incorporated into this study are fundamentally micro-foundational, and accordingly require an investigative approach that is also micro-foundational.

This calls for the employment of a within-case investigative approach at the micro-level of analysis.

[7] The expected contribution to family planning programmatic interventions therefore relates predominantly to the identification of *what* to focus on rather than providing the detail of *how* interventions might best be designed and implemented to produce the desired changes.

[8] An alternative possible definition of the fertility outcome would examine the number of live births. However, since the demand for children relates to living children, not live birth events, and because child mortality has the potential to instigate additional fertility for 'replacement' children in order to meet demand, the definition adopted for the fertility outcome appears more appropriate for the development of the analytic link between fertility demand and fertility outcome.

However, because we are investigating differing fertility outcomes, rather than one particular type or level of fertility outcome such as a low fertility outcome of say two or fewer children, this calls for the employment of an investigative approach which allows for the theory driven comparison of couples with appropriately differing fertility outcomes.

In consequence there is a need also for the employment of a cross-case comparative investigative approach at the micro-level of analysis.

Due to the requirement then to conduct theory driven in-depth within-case investigations of instances combined with their cross-case comparison, the number of instances to be examined is necessarily restricted to a relatively small number due to the constraints imposed by the limitations of time and resources.

The key challenge then becomes one of how best to generalise any explanation developed for differences in the fertility outcomes of the couples examined in this small-N investigation to that of unobserved couples living in the population of interest.

This research problem therefore presents the classic challenge of social research, that of reconciling on one hand the aim to develop an understanding as to how causes produce their effects, feasible in this study only through the in-depth examination of a relatively small number of instances, with on the other hand the aim to understand whether, or to what extent, this explanatory understanding is actually relevant, and therefore generalisable or transferable, to the many unexamined instances to which the research problem relates.

This research problem and the methodological response it demands for its solution has close similarity to the type of research problems and approaches that characterise theory driven programme evaluations.

The theory driven approach to the evaluation of programmes is increasingly espoused by academics, practitioners and organisations as the preferred method of evaluation, is widely adopted for evaluations of community change initiatives and public health programmes and interventions, and is increasingly promoted more generally in international development (Coryn et al. 2011:200).

The ‘theory’ to be assessed in a theory driven evaluation is the programme theory which refers to “the mechanisms that mediate between the delivery (and receipt) of the program and the emergence of the outcomes of interest’’ (Weiss 1998:57).

Although this study is not limited to the exclusive examination of the Bangladesh family planning programme theory because the Readiness to limit fertility is also being examined, the principle approach of theory driven programme evaluation appears highly relevant regardless of whether the posited determinants are deliberately created through programmatic interventions or occur naturally. All the theories of fertility under examination can be assessed using this approach.

Weiss (1998:272-7) notes that theory driven evaluation seeks to answer a range of questions requiring a mix of analytic strategies, including:

- How the outcomes of programme recipients differed from non-recipients, requiring some form of comparative analysis that implies counterfactual analysis
- Whether the programme was actually the cause of any changes that occurred in outcomes, requiring some form of analysis capable of ruling out rival explanations
- Which characteristics of the programme or the people in the programme were associated with varying performance in producing the outcome, requiring some form of disaggregation analysis
- Which particular combinations of factors were associated with varying performance in producing the outcome, requiring some form of combinatorial analysis
- Through which processes did changes in the outcome occur, requiring the comparison of the processes through which change in the outcome was expected to occur in the programme theory against observed events

The analytic response to these theory driven evaluation questions therefore requires a mixture of comparative counterfactual analysis, rival theory elimination, disaggregation or case-type analysis, combinatorial factor analysis, and process tracing.

Q2. How likely will family planning programmatic interventions succeed in reducing the fertility outcomes of the urban poor in Chittagong?

This research problem requires a methodological response that is similar to that required by an ex-ante evaluation of a programme theory, a type of evaluation that is commonly known as logic analysis. Logic analysis (not logical modelling) aims to assess the plausibility of a programme theory by comparing the programme's theorised causal chain linking the intervention with intended outcomes, against available knowledge (Brousselle & Champagne 2011:70).

Because the methodological response to the first research question of this study requires the employment of process tracing to examine the (RWA based) causal chain leading to the fertility outcomes of couples, a comparison of the family planning programme theory with the knowledge provided by the conclusions arrived at for the first research question appears highly appropriate for contributing towards a response to this question.

For example, in terms of the RWA framework if the explanation to be developed were to find that the Willingness to limit fertility is based primarily on the degree of religiosity but family planning programme interventions geared towards the development of Willingness are primarily focused on the reduction of health concerns related to the use of contraception, or if the Ability to limit fertility were found to be based primarily on the direct monetary affordability of contraception but programme interventions geared towards the development of Ability are primarily focused on increasing the physical accessibility of contraception, such an assessment of the programme theory against the explanation developed would suggest that the programme in its current form would be unlikely to succeed in reducing fertility outcomes and point to what instead would be more likely to succeed.

An assessment of how likely programme interventions will reduce fertility outcomes in the population of interest therefoe requires a comparison of the current family planning programme theory against the (generalisable) explanation to be developed for differing fertility outcomes amongst the examined couples and other available relevant knowledge.

Summary of the methodological responses demanded by the research questions:

Bearing in mind that due to the 'language issue' the overall approach to be adopted in this study must be heavily inclined towards deductive theory testing, objectivity and structure, the methodological responses required for the two core research questions of this study are summarised below:

Table 3.1	**Methodological responses demanded by the research questions**	
Question:	Q1. What are the major determinants and underlying causal mechanisms of differing fertility outcomes within the urban poor of Chittagong?	Q2. How likely will family planning programmatic interventions succeed in reducing the fertility outcomes of the urban poor in Chittagong?
Seeking:	Explanation	Plausible assessment
Requirements:	Theory and hypothesis testing	Assessment of the family planning programme theory in relation to the conclusions of Q1. and other available relevant knowledge.
	Counterfactual analysis	
	Rival theory elimination	
	Case-type analysis	
	Combinatorial factor analysis	
	Process tracing	
	Small-N investigation	
	Generalisation of results	
Similarities with:	Theory driven outcome evaluation	Ex-ante programme theory evaluation

It is clear that Question 1 and the response to be delivered to it is at the methodological heart of this study whereas Question 2 and the response to be delivered to it provides the key motivation of the study. Because Question 1 needs to be addressed first, and this requires the small-N within-case investigation of instances combined with their cross-case comparison, it is necessary now to examine within-case methods and the structured form of cross-case methods known as comparative methods.

3.3 - Case Methods, Comparative Methods and the Methodological Way Forward

It is appropriate before providing an overview of case methods and comparative methods to clarify the usage of the term 'case study' in the title of this study.

Rohlfing (2012:1-2) distinguishes between theory-centred case studies and case-centred case studies, whilst emphasising that their goals are compatible and not mutually exclusive. A 'theory-centred case study' aims to contribute to the advancement of general theory through the examination of specific cases in order to produce general theoretical statements that extend beyond the empirically examined cases (Rohlfing 2012:1-2). This mirrors Stake's (1995:3) 'instrumental case study' which is undertaken when there is a need to develop a general understanding of a particular research question or problem, and a particular single case is investigated with the aim of contributing to this more general understanding, that is, the case is of instrumental interest.

A 'case-centred case study' in contrast proceeds on the basis that theory is instrumental in the formulation of a comprehensive explanation of a single case, with the implication that the insights derived from the case study are not taken for the advancement of general theory and the explanation thus formulated is not generalised to other cases (Rohlfing 2012:2). Stake (1995:3) refers to an 'intrinsic case study' in which the investigation of a particular single case is undertaken because the case is of intrinsic interest, that is, there is a need to learn about that particular case rather than other cases or some general problem.

The use of the term 'case study' in the title of the study is appropriately understood as being aligned to Rohlfing's (2012:2) case-centred case study and Stake's (1995:3) intrinsic case study. A comprehensive understanding of the urban poor within Chittagong however is not the objective of the study. Rather, the urban poor within Chittagong are of intrinsic interest due to their generally high fertility outcomes and the effect a reduction would have in reducing the overall aggregate fertility rate across Bangladesh with beneficial implications in relation to the severity of the looming demographic crisis. In this sense the possible benefits reach beyond the immediate boundaries of the case study, but methodologically speaking the focus of the study is

solely upon the fertility of the urban poor within Chittagong, and the generalisability of any results beyond the urban poor of Chittagong would be incidental.

Beyond differences in the understanding of the term 'case study', George & Bennett (2015:18) point out in relation to small-N studies the potential for confusion in the usage of the terms case study methods and comparative methods. Whilst one view considers case study methods as distinct and relating to investigations focused on the within-case examination of single cases another view considers both methods to be variants of case study designs (George & Bennett 2015:18; Yin 2003:14).

Adding to this confusion are assertions that comparative methods are holistic in their approach. Ragin (2008:181) for example argues that comparative methods allow cases to be studied holistically with attention to specific configurations of attributes in contrast to large-N statistical approaches which examine correlations between variables.

Caramani (2009:30) points out that whether an approach is deemed variable oriented primarily relying on large-N statistical designs or whether it is deemed case oriented and proceeding with small-N comparative methods both ultimately reason in terms of variables and are interested in variable analysis. Similarly, Schmitter (2008:274-5) asserts that in the employment of comparative methods the selection of cases occurs on the basis of the configuration of variables not individual cases, and so with both statistical approaches and comparative methods it is usually variables that are actually compared "one or many, alone or in clusters – not units" (Schmitter 2008:275).

Accordingly, this view holds that the fundamental principles under which both (large-N) statistical approaches and (small-N) comparative methods proceed are one and the same (Caramani 2009:2; see also Della Porta 2008:200-2).

Gerring's (2007:21) assertion that the case study is typically focused on within-case variation whilst the cross-case study is typically focused on cross-case variation is aligned with the understanding underlying the distinction already made in this study with regards to the need to proceed with a combination of a within-case investigation to examine mechanisms and a cross-case investigation to compare couples with differing fertility outcomes.

The mainstream discipline of economics does not employ within-case methods to any apparent extent unlike a range of other disciplines in the social sciences. As such, the employment of what are commonly interchangeably referred to as case methods, within-case methods or case studies is now examined in relation to the discipline of economics and the social sciences more generally in order to consider key issues, reservations and possible pitfalls to avoid.

3.3.1 - An Overview of Case Methods

Process tracing, described by commentators as an important, possibly indispensable, element at the empirical core of many if not most case study research (Rohlfing 2012:150; Vennesson 2008:224), aims to identify causal mechanisms and the causal chains upon which they are located between independent variables and the dependent outcome and can be used for theory testing as well as theory development (George & Bennett 2005:206; Vennesson 2008:231). Additionally, process tracing offers the potential means through which to empirically examine actor's preferences, perceptions, goals, values and their own specification of the situations they experience (Vennesson 2008:233).

As such, process tracing is argued to be fundamentally different to methods which rely on covariance or comparisons across cases because in the use of theory for the development of explanations of cases, all intervening steps within a case must be predicted by the hypothesis – it is not sufficient for example, for the hypothesis to be consistent with a statistically significant number of intervening steps (George & Bennett 2005:207).

Whilst the employment of within-case techniques such as process tracing is unusual in the discipline of economics, the nature of the research problem and the relevant theories are such that both call for the in-depth analysis of relevant instances at the micro-foundational level, that is, the separate individuals that constitute a couple and the couple as a whole.

This is not to suggest that the investigation of instances at the micro-foundational level through the employment of within-case methods is fundamentally inconsistent in

principal as a response to the requirements of many important research problems to be found in the discipline of economics.

Mainstream economics, associated with neoclassical economics, is wedded to the doctrine of methodological individualism, which holds that explanations of social, political, or economic phenomena can only be regarded as adequate if formulated in terms of the properties, beliefs, attitudes, and decisions of individuals (Blaug 1992:44; Boland 2003:31; Himmelweit, Simonetti & Trigg 2001:4; Maki, Gustafsson & Knudsen 1993:24).

Blaug (1992:46) argues that the strict interpretation of methodological individualism implies the rejection of all macroeconomic propositions that cannot be reduced to microeconomic ones, and since so few have been reduced, the virtual rejection of the whole of received macroeconomics.

Of course, mainstream microeconomics also takes independent individual units as the starting point of inquiry and proceeds on the basis of decisions made by individual units in the economy being aggregated by the market to determine what happens in the economy as a whole (Himmelweit et al. 2001:2).

The mainstream assumption that the decisions of these individual units are 'rational' in the specific sense that goals are given and individuals are assumed to be pleasure, that is utility, maximising within their budget constraints, and firms profit maximising within their technical constraints, are however rejected by evolutionist and institutionalist schools of thought within the discipline (Himmelweit et al. 2001:19).

The old institutionalists argue that power, adventure, independence, altruism, curiosity, custom and habit can also all be powerful motivators in the realm of economic behaviour (Wilber & Harrison 1978:72).

The new institutionalists assume decision making as characterised by bounded rationality with limited perceptional, cognitive, and intellectual capabilities in contrast to the mainstream which does not allow for these limitations in its assumption of rationality (Robin & Staropoli 2008:146).

There is however an analytical 'firewall' in the mainstream that separates the contested core assumption of rational decision making that influences behaviour at

the micro-foundational level within individual units, and the empirical examination of this behaviour.

This firewall is provided by the use of aggregation:

“The rationality postulate refers to individual motivation but the behavior in which economists are interested is the behavior of aggregates of consumers and producers in different markets” (Blaug 1992: 231-2).

Hoover (2009) accordingly complains that “the irony of the program of microfoundations is that, in the name of preserving the importance of individual intentional states and preserving the individual economic agent as the foundation of economics, it fails to provide any intelligible connection between the individual and the aggregate” (Hoover 2009:405).

Given that the entire structure of mainstream economics rests upon the foundation of the individual unit, and given the scepticism in some quarters towards the assumptions as to what actually happens within the individual unit, it would be reasonable to expect the widespread employment of within-case methods to investigate these issues.

Most economists are after all positivists who view empirical verification as the key to economic science (Wilbur & Harrison 1978:64), and would therefore be expected to subject both the assumptions of models as well as their predictions to empirical testing in order to distinguish myth from reality:

“a common device in positive social science is to contrast ‘myth’, as widely shared belief, with ‘reality’, revealed by empirical research; the task of the social scientist is to expose this falsehood and discard what is not empirically verifiable or falsifiable” (Della Porta & Keating 2008:22).

If making sound prediction alone was achievable without recourse to the empirical testing of underlying assumptions, such talent of a discipline might still be useful in practical terms, and would be consistent with the view in mainstream economics that “correct predictions imply correct explanations” (Wilbur & Harrison 1978:66), but given that “standard economists place so much weight on the ability to predict as the means of verifying the truth of a theory” (Wilbur & Harrison 1978:66), it is unfortunate

that economics does not manage to yield this prize either, a situation that might actually be arising in the first place due to the continued use of potentially faulty underlying assumptions:

“if the rationality postulate is truly false, it may be one of the reasons why microeconomics is so poor at explaining the patterns of consumption of many households and the price-setting patterns of firms in many markets” (Blaug 1992:223).

The reasonable response to these challenging issues is therefore to investigate what happens at the micro-foundational level within the individual units:

“what is clear is that the direct investigation of rational action, the attempt to test the urgency of the assumption of rationality, should not be dismissed out of hand as "ultraempiricism." This much we do learn from the methodology of economics. So long as tests of the accuracy of predictions remain ambiguous - that is to say, forever - it will remain important also to test the descriptive accuracy of assumptions and to take the results of these tests seriously” (Blaug 1992:223).

The employment of within-case methods in mainstream economics however remains far from conventional (Alston 2008:146) yet is, for the reasons discussed, far from unrequired.[9]

Beyond the mainstream, old institutional economists for whom “An analysis of why is necessary” (Wilbur & Harrison 1978:64) have a long traditional of employing what is in essence a systematic holistic case method known as pattern modelling (Wilber & Harrison 1978:71).

New institutionalists also employ a form of within-case method known as analytical narratives where the term analytic denotes the use of theory and the term narrative denotes the use of qualitative evidence (Alston 2008:146), although the main approach adopted in testing predictions is statistical and econometric in nature (Robin & Staropoli 2008:144). The key aim of the analytic narrative is “to account for outcomes by identifying and exploring the mechanisms that generate them” (Bates et al. 1998:12).

[9] One possible explanation for this is that rationality as defined in economics is part of the Lakatosian ‘hard core’ of the neoclassical research programme and is therefore not subject by convention to empirical refutation – it is off-limits, sacrosanct (see Blaug 1992:230).

The employment of within-case methods therefore is not unknown in the discipline of economics although this only occurs outside of the mainstream.

Even at the fringes of the discipline however, it appears that underlying assumptions relating to the individual avoid testing. For example, whilst bounded rationality is central to behavioural theory in new institutional economics (Robin & Staropoli 2008:146), Foss (2003:158) points out that even in relation to investigations into the economics of organisation in which bounded rationality (BR) is invoked with the most frequency, its invocation is primarily rhetorical in the "sense of dressing up a theory with arguments that are essentially empty in an explanatory sense, but are nevertheless made because they help to persuade" (Foss 2003:158) and notes that "BR is never explicitly modeled on the level of the individual agent" (Foss 2003:164).

Therefore, the aim in this study of developing a causal explanation for differing fertility outcomes of couples within the population of interest through the within-case examination of mechanisms at the micro-foundational level finds itself bereft of methodological guidance from the discipline of economics.

One major reason why within-case methods are generally not employed in economics to develop explanations of what occurs within individual units arises from the difficulty of generalising these explanations (Alston 2008:103).

This tension between the dual research aims of producing within-case explanations and the generalisation of such explanations to other cases is exemplified by Alston (2008:104-5) when he asserts that the use of case methods in new institutional economics is important because "there is no grand all encompassing theory of institutional development and change" (Alston 2008:104) whilst simultaneously issuing the dire warning of the need to "prevent the research from becoming simply a "good story."" (Alston 2008:105).

The generalisation or transference of the developed explanation for differences in the fertility outcomes of couples to unobserved couples in the population of interest therefore also finds itself wanting for methodological guidance from the discipline of economics.

Casting the net beyond economics, case methods are popular in almost all fields of social science (Blatter & Haverland 2012:1) and are said to occupy a central position in disciplines such as anthropology, business, education, history, psychology, sociology and political science (Gerring 2007:2). Advocates argue that in many fields and disciplines, there are examples of case studies that have acquired the status of classic works (Blatter & Haverland 2012:2; Gerring 2007:2), that case studies have produced a significant part of what is known about the social and political world (Vennesson 2008:223), and that the social sciences continue to produce vast quantities of case studies (Gerring 2007:2).

In spite of this apparent success of case studies along several dimensions, they tend to be viewed by most methodologists with "extreme circumspection" (Gerring 2007:6) or "scepticism and disdain" (Blatter & Haverland 2012:1).

This reputation might partially be the result of the very strengths and advantages of case methods in relation to other methods – their potential flexibility and versatility in response to the research problem at hand.

For example, the conceptions of case studies can range from the most positivist to the most interpretivist (Vennesson 2008:225-6). There are a variety of case selection techniques that can be employed. Gerring (2007:89-90), in a chapter co-authored with Jason Seawright, discusses nine: Typical, Diverse, Extreme, Deviant, Influential, Crucial, Pathway, Most-similar, and Most-different. Case studies can also differ on a variety of characteristic dimensions such as the number of instances examined, the nature and richness of data, the means of data collection, generalisation, the extent of induction or deduction, the importance accorded to time span and historical depth, access to actors, the units of analysis, the connection to fieldwork, and participant observation (Vennesson 2008:225).

Given the versatility of case methods, differences of opinion as to appropriateness of design and execution are much more likely to emerge in contrast to less flexible, relatively mechanistic methods.

The very flexibility of case methods can therefore also be viewed as a major source of disadvantage, because there are a wide range of available strategies and options from

which to choose and combine when tacking any particular research problem – there is no ready-made 'template' available.

This might explain to some extent what Gerring (2007:2-6) refers to as the conundrum of the case study: on the one hand we observe the success of case methods in producing classics and their widespread employment in the social sciences, and on the other hand there is the general identification amongst methodologists of case methods with informal and undisciplined research designs, loosely framed and non-generalisable theories, biased case selection, weak empirical leverage understood as having too many variables and too few cases, subjective conclusions, non-replicability, and causal determinism.

Accordingly, it is prudent to proceed towards the research problems at hand with the awareness that the potential advantages that flow from the employment of within-case methods carry with them an unusually heavy tariff with regards to the required clarity and transparency of methodological justification.

Since the development of an explanation for fertility outcomes requires a comparison of couples with different fertility outcomes, it is necessary now to turn towards a particular family of highly structured cross-case methods known as the comparative methods.

3.3.2 - An Overview of Comparative Methods

Both sociology and political science have an extensive history with the comparative methods (see Della Porta 2008:198-202; George & Bennett 2005:158-9; Sekhon 2004:282). Particularly with regards to macro level phenomena the examination of a small number of cases might occur because there are only a few instances which exhibit the particular attributes of the phenomenon of interest or due to the opinion amongst some researchers that political or sociological phenomena in general are most appropriately understood through the in-depth examination of a small number of cases (Bollen, Entwisle & Alderson 1993:326; Collier 1993:105).

The mainstream discipline of economics in contrast, relying on micro-foundational assumptions but focused on the analysis of the aggregate through large-N statistical

and econometric approaches has had little, if any, occasion to employ the comparative methods.

Caramani (2009:16) notes that even whilst the comparative methods have rarely been applied at the level of the individual, they can be employed for the investigation of any type of unit of analysis.

Comparative methods are often seen as a bridge between case-oriented qualitative approaches and variable-oriented quantitative approaches, capable of circumventing some of the limitations of both whilst at the same time offering many distinct features and advantages (Ragin & Rubinson 2009:13).

Ragin & Rubinson (2009:15) argue that whilst generally theory building is more often associated with inductive small-N qualitative case methods and theory testing is more often associated with deductive large-N variable based quantitative methods, comparative methods maintain the integrity of the cases whilst at the same time allowing for the examination of patterns of association between variables.

Because with a moderate-N, usually around 5–50 instances, it is possible to examine both cross-case patterns of association and the details within each instance, comparative methods can be used for theory building, hypothesis testing, theory refinement, adjudication between competing theories and are highly compatible with middle range theories for the identification of relevant variables, developing an explanation of how variables are related to one another, and the elucidation of the specific contexts under which these relationships are likely to hold (Ragin & Rubinson 2009:15).

Comparative methods therefore appear well suited to tackling the research problem at hand.

The two dominant formal implementations of the comparative method are J. S. Mill's Methods of Agreement and Difference and Ragin's Qualitative Comparative Analysis (QCA) (Ragin & Rubinson 2009:14).

Mill's Inductive Methods

The essential logic underlying the comparative method is derived from Mill's inductive methods (George & Bennett 2005:153) and provides the basis for investigations into some very important questions in the social sciences (Lieberson 1994:1225).

The two major designs used in the comparative method, the Method of Agreement and Method of Difference, have been intensively discussed for decades (Rohlfing 2012:105), and are argued to provide, for case-oriented researchers pursuing holistic comparisons, "the chief methodological inspiration" (Goldthorpe 2000:47).

Despite the widespread use of these two methods, Rohlfing (2012:113-4) argues that their limitations have resulted in the adoption by some commentators of a very pessimistic view towards small-N cross-case comparisons and inferences.

Common to discussions on the limitations of Mill's inductive methods are three restrictive assumptions in particular: deterministic regularity, the existence of a single exclusive cause, and the absence of measurement error (e.g. George & Bennett 2005:155; Levy 2008:10; Lieberson 1991:315-316; Sekhon 2004:281).

Sekhon (2004:281) argues that some researchers appear to be either unaware or unconvinced of the methodological difficulties that arise from the strict assumptions that have to hold in order to attempt valid causal inferences using Mill's methods, and Lieberson (1991:318) complains in relation to small-N macro-level comparative investigations that the restrictive assumptions are typically neither made explicit nor seriously examined even though they are "assumptions that are usually indefensible in social research" (Lieberson 1991:318).

Even advocates of QCA, with its own logical foundations based on Mill's inductive methods of which the Method of Agreement and Method of Difference are considered to be the most important (Berg-Schlosser et al. 2009:2), view both of these methods as "somewhat extreme in the sense that they attempt to establish a single common cause, or its absence by controlling all other possibilities and the entire environment" (Berg-Schlosser et al. 2009:2) and are highly critical of Mill's underlying notions of causation, arguing that "such relatively mechanical and deterministic relationships can be established only rarely even in the "hard" sciences" (Berg-Schlosser et al. 2009:2).

Qualitative Comparative Analysis

Qualitative Comparative Analysis (QCA) is an alternative comparative method to Mill's Method of Agreement and Method of Difference, although its methodological lineage traces back to these two methods (see Berg-Schlosser et al. 2009:2).

Whilst QCA was originally introduced by Ragin (1987) as "a middle road between the two extremes, variable-oriented and case-oriented approaches" (Ragin 1987:168) with aspirations to "integrate the best features of the case-oriented approach with the best features of the variable-oriented approach" (Ragin 1987:84), advocates appear to be more comfortable now in presenting QCA as a specific family of configurational comparative methods (Rihoux 2006:681) and characterise its essence as that of "a case-sensitive approach" (Rihoux 2006:682).

Since its introduction the original crisp set QCA (csQCA) in which conditions (variables) have dichotomised values of present or absent has been joined by variants multi-value QCA (mvQCA) which differentiates itself to csQCA primarily on the technical feature of allowing the analysis of multi-value conditions, and fuzzy set QCA (fsQCA) which differentiates itself more fundamentally to csQCA due to its closer alignment in approach to conventional statistical and correlational analysis (Rihoux 2006:685).

Because fsQCA is relatively removed from the examination of individual cases and is well suited "to research designs in which the comprehension of each individual case matters much less" (Rihoux 2006:685), fsQCA is of little relevance to this study, and because mvQCA is an extension of csQCA and therefore retains its main principles (see Cronqvist & Berg-Schlosser 2009:70), it is the original crisp set version of QCA, csQCA, that is of primary relevance to this study.

Since its introduction, csQCA has been employed in a growing variety of disciplines including political science, sociology, political economy, management studies, criminology, history geography, psychology and education studies (Rihoux 2006:697) and whilst initially applied in macro-level investigations has increasingly been applied in meso-level and more recently even micro-level investigations (Berg-Schlosser et al. 2009:4).

Advocates point to two key analytical advantages QCA enjoys over Mill's methods - the capabilities to analyse multiple complex causes and counterfactuals:

"Qualitative Comparative Analysis…builds upon Mill's methods in two fundamental ways. Most significantly, QCA permits the analysis of multiple conjunctural causation, addressing the greatest limitation of Mill's methods. Moreover, by employing counterfactual analysis, QCA permits a more nuanced analysis of the relationship between causal conditions and the presence and absence of outcomes" (Ragin & Rubinson 2009:26).

QCA is therefore viewed as a comparative method to which "most limitations associated with Millian methods cannot be extended" (Mahoney 2007:135) and described as "one of the few genuine methodological innovations of the last few decades" (Marx & Dusa 2011:104). QCA thus appears to provide several important analytical features and capabilities that are highly relevant for addressing the first research question at hand, as summarised in the table below.

Table 3.2 **The alignment of the analytical capabilities in QCA with the requirements of the first research question**

Question:	Q1. What are the major determinants and underlying causal mechanisms of differing fertility outcomes within the urban poor of Chittagong?	Analytical capabilities in QCA:
Seeking:	Explanation	X
Requirements:	Theory and hypothesis testing	Theory and hypothesis testing (Berg-Schlosser et al. 2009:16)
	Counterfactual analysis	Counterfactual analysis (Ragin & Rubinson 2009:26)
	Rival theory elimination	Rival theory elimination (Berg-Schlosser et al. 2009:10)
	Case-type analysis	Case-type analysis (Rihoux 2006:682; Berg-Schlosser et al. 2009:6)
	Combinatorial factor analysis	Combinatorial factor analysis (Marx & Dusa:105; Berg-Schlosser et al. 2009:8)
	Process tracing	X
	Small-N investigation	Particular affinity with small to intermediate-N investigations (Berg-Schlosser et al. 2009:3-5; Berg-Schlosser & De Meur 2009:23)
	Generalisation of results	Capable of "modest generalizations" (Berg-Schlosser et al. 2009:12)

It will be noticed that QCA does not provide the analytical capability of process tracing and therefore is unable to furnish an explanation for how posited causes produce their effects. Advocates argue that this "problem does not constitute a real critique because QCA simply does not aim to explain the mechanisms at work behind the variables" (De Meur, Rihoux & Yamasaki 2009:160). Instead, the development of such explanation is to be achieved through a re-examination of the cases after the process of QCA analysis is concluded in order to produce a causal interpretation (Rihoux & De Meur 2009:65).

QCA nevertheless appears to provide the overall analytical approach within which to proceed, and to which the capability of a more deductive, objective and structured form of process tracing might be incorporated.

3.3.3 - The Methodological Way Forward

Given the apparent advantages that QCA has to offer over the use of Mill's methods, the obvious methodological choice to proceed with is that provided by QCA. There are however two good reasons and one necessary reason as to why the development of the methodology for this study calls for an examination of both QCA and Mill's methods.

First, John Stuart Mill (1806-73) was a prominent classical economist along with Adam Smith (1723-90) and David Ricardo (1772-1823) (Himmelweit et al. 2001:4). Neoclassical economists built upon the work of the classical economists but focused their attention towards one particular aspect of classical economics - the workings of the price mechanism in a competitive market economy based on the behaviour of individuals (Himmelweit et al. 2001:4).

This strong lineage in the discipline of economics tracing back to Mill might explain Hausman's (1989) observation that of the four approaches that dominate discussion in relation to the appraisal of microeconomic theory, the deductivist, positivist or Popperian, the predictionist, and the eclectic, it is Mill's deductivist approach that stands forth most prominent in terms of practical employment amongst economists, even though as De Marchi (1986:96) points out this continued acceptance of what is

now referred to as the deductive-nomological model of explanation is sometimes presented in Popperian guise.

Given that this study requires the adoption of a more deductive approach due to 'the language issue' and the extent of Mill's influence in deductive methods as well as in the discipline of economics generally, an examination of Mill's ideas appears warranted and potentially beneficial.

Second, Mill's influence is not limited to deductive methods and the discipline of economics. Methodologists have observed that in the social sciences generally, statistical approaches are aligned in their logic of inquiry to Mill's Method of Concomitant Variations, which focuses on quantitative co-variations between independent and dependent variables, and small-N comparative approaches are aligned in their logic of inquiry to Mill's Method of Agreement and Method of Difference, which focus respectively on the identification of similarities and differences across cases (Della Porta 2008:204).

The influence of Mill's methods therefore extends across disciplines and methodological traditions in the social sciences and further highlights the potential benefit of examining his ideas and methods in more detail.

Third, aside from any potential benefits that may be gained from an examination of Mill's ideas and methods, there is one overarching reason which renders such an examination critical to the development of methodology in relation to the first research question at hand.

What is clear from the literature that discusses Mill's methods is the lack of clarity and the profusion of contradictory assertions made by commentators on various aspects of Mill methods, including how he views his own methods and the nature of the results his methods are capable of yielding.

A small selection is presented here to illustrate the extent of this confusion and contradiction:

1) Mill has serious doubts about the effectiveness of his methods:

   "Mill himself emphasized the serious obstacles to making effective use of these methods in social science inquiry" (George & Bennett 2005:154).

2) Mill has no doubts about the effectiveness of his methods - he champions inductive inquiry & he rejects the notion of causal necessity:

   "Along with his championing of inductive inference, Mill also argued against the view that causal relations involve necessity, in the sense that they could not be otherwise" (Hammersley, Gomm & Foster 2000:243).

3) Mill does not champion inductive inquiry - he rejects it:

   "Mill is not fully against the application of his methods; he is, however opposed to their implementation in an inductive fashion" (Rohlfing 2012:100).

4) Mill does not reject the notion of causal necessity - his method of agreement specifically investigates causal necessity:

   "J.S.Mill's (1843/1974) method of agreement, which is a strategy for examining hypotheses about necessary conditions" (Goertz & Mahoney 2012:179).

5) Mill rejects the notion of causal necessity & he rejects deduction:

   "For Mill, by contrast, causal relations are simply regularities to be found in the world. Mill's rejection of the idea that causal powers are involved, such that *A necessarily* produces *B*, is simply the other side of his rejection of deduction as a source of knowledge" (Hammersley et al. 2000:243, original emphasis).

6) Mill does not reject deduction – he advocates it:

   "Mill concludes at the end of a critical discussion of his methods that one should rely on the 'deductive method'" (Rohlfing 2012:100).

When the assertions by commentators on Mill's ideas and methods are contrasted against what Mill (1882) actually states and elaborates, the differences that emerge tend to be erroneous rather than the type of differences that might occur as a result of nuanced interpretation.

For example, Van Heuveln's (2000) assertion regarding the inference of causality from the Method of Agreement, in a paper specifically aimed at clearing up misconceptions about Mill's methods, can be contrasted to Mill's (1882) own assertion in this regard:

1) Without reservation, the Method of Agreement produces causal conclusions:

   "Mill's description leaves no room for misinterpretation: If there is a single circumstance that is present in all positive instances, then by the Method of Agreement we can induce that it was this circumstance that was the cause of the phenomenon. Indeed, I have seen no textbook that gave any other interpretation of the Method of Agreement" (Van Heuveln 2000:21).

2) Without reservation, the Method of Agreement cannot produce causal conclusions:

   "We found that the Method of Agreement has the defect of not proving causation, and can, therefore, only be employed for the ascertainment of empirical laws" (Mill 1882:647).

Given that Ragin (1987) introduces QCA as an advanced alternative to Mill's methods, and QCA is therefore considered free from most of the limitations associated with Mill's methods (Mahoney 2007:135), there is no question of the need for a high degree of accuracy in the assertions by advocates of QCA in relation to Mill's ideas and methods and how QCA improves upon them. Ragin (1987) however upon the very launch of QCA makes an erroneous assertion with regard to even the coverage by Mill of an important methodological issue:

1) Mill neglects to consider the possibility of two causes constituting a single cause at a higher level of conceptual abstraction:

   "Of course, it still might be possible to argue in advance that two causes are somehow equivalent at the conceptual level, and the presence of either constitutes a single, invariant cause. Mill did not address this issue directly because of his interest in techniques of inductive inquiry" (Ragin 1987:38).

2) Mill does consider this possibility and provides an example:

> "If, on further analysis, we can detect in these any common element, we may be able to ascend from them to some one cause which is the really operative circumstance in them all. Thus it is now thought that in the production of heat by friction, percussion, chemical action, etc., the ultimate source is one and the same" (Mill 1882:544).

It becomes imperative now in the development of the methodology for this study not take any assertions regarding Mill's ideas and methods or any claims made by advocates of QCA of its advancements in this regard at face value, but to examine Mill's ideas and methods directly at source and contrast them against what QCA has to offer.

3.4 - A Methodological Comparison of QCA vis-à-vis Mill

A methodological comparison of QCA with Mill (1882) requires firstly, a brief overview of Mill's (1882) inductive methods. Generally when case methodologists and advocates of QCA refer to Mill's methods, it is exclusively these inductive methods they are referring to. Second, underlying notions of causation are then compared and as various issues emerge they are discussed in detail. Finally, an overall assessment as to the claim of QCA innovations and advancements vis-à-vis Mill (1882) is undertaken.

3.4.1 - Mill's Inductive Methods

Mill's methods are presented in A System Of Logic, Ratiocinative And Inductive, of which there are eight editions. This study examines the final word of Mill in this regard as expressed in the 8th edition of 1882.

Mill (1882) presents his inductive methods as ideal type methods and then critically assesses them as he progressively places them in the context of his understanding of causal reality, whilst at the same time building upon and fortifying a lengthy argument for the rejection of the inductive methods and the employment instead of the Deductive Method and it's variant the Hypothetical Method for social science inquiry.

Case-oriented methodologists appear to fall foul of the tendency to narrowly assess Mill's methods mainly on the basis of the canons of the ideal type inductive methods and with little regard to what else Mill has to say about them in the surrounding pages and chapters. Even before his exposition of the inductive methods, Mill (1882) is absolutely clear about his intentions when he asserts with regards to the social sciences and other sciences in which artificial experiments are impossible or have a very limited range that "the methods of those sciences, in order to accomplish any thing worthy of attainment, must be to a great extent, if not principally, deductive" (Mill 1882:474).

The type of inconsistencies already highlighted in the interpretation of Mill's methods and ideas arise partly because Mill's (1882) description of the inductive methods in their ideal form, and before his progressive rejection of them, involves a style of writing which provides the reader who is narrowly focused on the details of their possible application, little to correct the erroneous impression that these methods, because they are introduced by Mill, are advocated by him. Another reason for the inconsistencies surrounding Mill's methods stems from the fact that, with the notable exception of Rohlfing (2012), few commentators on methodology appear inclined to attach page number citations or quotations when discussing Mill's methods and ideas, except with regards to the basic canons of the ideal type inductive methods.

Accordingly, this study engages in a more comprehensive examination of Mill (1882), and mindful of the need for clarity and transparency in methodological justification there is a liberal use of both page number citations and quotations. Whilst in a study of this type space is always at a premium, it is nevertheless considered essential to adopt this strategy.

The examination of Mill's (1882) methods commences with an brief overview of four of the five ideal type inductive methods.[10]

Footnotes are used to highlight and contextualise points as they emerge in relation to case oriented methodology generally and QCA in particular.

[10] The Method of Residues is not examined because it is not directly relevant to QCA or this study.

The Method of Agreement

Canon:

"If two or more instances of the phenomenon under investigation have only one circumstance in common, the circumstance in which alone all the instances agree, is the cause (or effect) of the given phenomenon" (Mill 1882:482)

The ideal Method of Agreement commences with the examination of instances that exhibit the phenomenon of interest but are different in every other respect (Mill 1882:482).

With regards to cause of a given effect investigations, instances that exhibit the given effect are examined to discover what they do not have in common and eliminate these factors as possible causes (Mill 1882:481).

In the ideal Method of Agreement, the cause is, or is to be found amongst, factor(s) that avoid elimination, the invariable antecedent(s) that are common to all instances (Mill 1882:481-2).

Mill (1882:481) warns us however that any conclusion of causality arrived at through the observation of invariable conjunction between antecedent and consequent using the Method of Agreement without an accompanying artificial experiment for verification, "remains subject to very considerable doubt" (Mill 1882: 481) because the antecedent and consequent might simply be invariably preceding each other "as day precedes night or night day" (Mill 1882:481).

Mill (1882:479-81) therefore harbours serious doubts as to the appropriateness of inferring causality through the Method of Agreement not only when we find constant conjunction between antecedent and consequent, but even when this constant conjunction is consistent with notions of temporal precedence.

The Method of Difference

Canon:

"If an instance in which the phenomenon under investigation occurs, and an instance in which it does not occur, have every circumstance in common save one, that one occurring only in the former; the circumstance in which alone the two instances differ, is the effect, or the cause, or an indispensable part of the cause, of the phenomenon" (Mill 1882:483).

Mill (1882) considers the Method of Difference to be, in comparison to the Method of Agreement, a "more potent instrument of the investigation of nature" (Mill 1882:482), and illustrates the key principle of arriving at causal inferences through the Method of Difference with the following example:

"When a man is shot through the heart, it is by this method we know that it was the gunshot which killed him: for he was in the fullness of life immediately before, all circumstances being the same, except the wound" (Mill 1882:483).

Whereas the Method of Agreement requires the examination of instances which exhibit the given circumstance of interest (antecedent or consequent) but apparently differ in all other respects, the Method of Difference requires the examination of two instances which differ in exhibiting the given circumstance but are apparently identical in every other respect (Mill 1882:482).

Therefore, whilst the Method of Agreement proceeds by "comparing different instances of a phenomenon, to discover in what they agree" (Mill 1882:483), the Method of Difference investigation into a phenomenon "compares an instance of its occurrence with an instance of its non-occurrence, to discover in what they differ" (Mill 1882:483).

Both methods are "methods of *elimination"* (Mill 1882:483, original emphasis):

"The Method of Agreement stands on the ground that whatever can be eliminated, is not connected with the phenomenon by any law. The Method of Difference has for its foundation, that whatever can not be eliminated, is connected with the phenomenon by a law" (Mill 1882:484)

Mill (1882:484) emphasises that in the Method of Difference the counterfactual pair of instances subject to comparison must be apparently identical except for the given antecedent or given consequent and circumstances which "are already known to be immaterial to the result" (Mill 1882:484).[11]

Mill (1882) points out however that this strict homogeneity requirement for the instances to be examined is unlikely to be fulfilled in observational research because "it is very seldom that nature affords two instances, of which we can be assured that they stand in this precise relation to one another" (Mill 1882:484).

The Joint Method

Canon:

"If two or more instances in which the phenomenon occurs have only one circumstance in common, while two or more instances in which it does not occur have nothing in common save the absence of that circumstance, the circumstance in which alone the two sets of instances differ, is the effect, or the cause, or an indispensable part of the cause, of the phenomenon" (Mill 1882:489).

The Indirect Method of Difference, also known as the Joint Method of Agreement and Difference (Mill 1882:489), is referred to in this study as the Joint Method.

Mill (1882:488) advocates the Joint Method for investigations when it is not possible to obtain a counterfactual pair of instances that conform to the strict unit homogeneity requirement of the ideal Method of Difference. Because in the employment of Method of Difference observational investigations this requirement is unlikely to be fulfilled (Mill 1882:484), Mill (1882) considers the Joint Method to be "sometimes of great avail in the investigation of nature" (Mill 1882:488).

The observational solution advocated by Mill (1882) is the Joint Method, which amounts to a double employment of the Method of Agreement, with one employment

[11] To clarify, the counterfactual pair must be apparently identical rather than actually identical, because if for example we are investigating into the cause of a given effect, with the given consequent present in one instance and absent in the other, with all other circumstances apparently identical in the two instances, we seek to discover what else these two instances differ in. Obviously if the instances are actually identical except for the given consequent, we would never discover an antecedent that also differs in the instances, which is the whole point of the investigation.

focused, as it usually would be in the Method of Agreement, on the examination of positive instances in order to establish that the presence of the antecedent and presence of the consequent are invariably connected, and the other employment focused on the examination of negative instances in order to also establish that the absence of the antecedent and the absence of the consequent are both invariably connected as well (Mill 1882:488).

The Joint Method, because it is based on the Method of Agreement, can similarly be employed for both cause of effect and effect of cause investigations.

Mill (1882) views the Joint Method as “a great extension and improvement of the Method of Agreement” (Mill 1882:489), and whilst unable to generate causal inferences that are “equivalent to a proof by the direct Method of Difference” (Mill 1882:489), it has the potential to generate inferences that “may approach indefinitely near to it" (Mill 1882:507).

The Method of Concomitant Variations:

Canon:

"Whatever phenomenon varies in any manner whenever another phenomenon varies in some particular manner, is either a cause or an effect of that phenomenon, or is connected with it through some fact of causation." (Mill 1882:495-6)

Mill (1882) introduces the Method of Concomitant Variations for investigations into a particular class of causes, referred to as “Permanent Causes” (Mill 1882:491), which are ever present and vary in terms of quantity or in terms of their relations to other things such as position in space (Mill 1882:491-4), but views the most extensive employment of this method in investigations characterised by the quantitative variation of causes (Mill 1882:498).

The Method of Concomitant Variation proceeds on the basis that variations in Permanent Causes produce variations in their effects:

“It very commonly happens….that the variations of an effect are correspondent, or analogous, to those of its cause” (Mill 1882:495).

Mill (1882:497) clarifies that even though variation in the antecedent is discovered to be invariably connected with variation in the consequent, the conclusion to be arrived at through the Method of Concomitant Variations is not one framed in terms of a relationship of variation between the antecedent and consequent, but rather that the antecedent is a cause, or connected with the cause, that produces the effect.

According to Mill (1882:496) we cannot conclude the existence of a causal relationship between two observed phenomena on the basis of their co-variation with one another because the two phenomena might simply co-vary with one another due to their being “two different effects of a common cause” (Mill 1882:496).

For Mill (1882:496) the only way to resolve this doubt is through the employment of the artificial experimental mode to ascertain whether one set of variations can be produced by means of the other, whilst retaining all the other antecedents unchanged, so that whilst we might be justified in "inferring causation from concomitance of variations, the concomitance itself must be proved by the Method of Difference" (Mill 1882:496), that is, according to the same principles of a Method of Difference longitudinal investigation in experimental mode.

Mill (1882:496) suggests that when such artificial experimentation is not possible, we should attempt to find the variations in nature where the pre-existing circumstances are perfectly known to us, but notes that “it is an attempt which is seldom successful” (Mill 1882:496).

3.4.2 - Notions of Causation

The overall conception of causality in QCA is based on four interlinked core notions of causation: first, multiple causation whereby several different causes can produce an effect, second, conjunctural causation whereby a cause can be constituted by a number of conditions, third with the use of INUS conditions with which a particular condition can have opposite implications for the effect depending on the other conditions it is combined with, and fourth that causation is asymmetric not symmetric (Berg-Schlosser et al. 2009:9).

A fifth ancillary notion of causation, chemical causation, is frequently referred to by advocates of QCA in their discussions of the notion of conjunctural causation (e.g. Ragin 1987:25; Yamasaki & Spreitzer 2006:102-103) and is indicated by Ragin (1987:25) as tracing a lineage back to Mill, but the notion of chemical causation itself appears to elude any elaboration or examination.

Since it is ultimately on the basis of underlying notions of causation that advocates of QCA lay claim to its advancement over Mill's methods (Berg-Schlosser et al. 2009:2-3; Ragin 1987:42, 1992:13), the four core notions of causation in QCA are now examined and contrasted against those held by Mill (1882).[12]

Ragin (1987) frames the notions of causation incorporated into QCA as an advancement arising from his assessment of the limitations of Mill's inductive methods (see Ragin 1987:36-42). This assessment of limitations however is based on an examination of Mill's ideal inductive methods which, as previously pointed out, Mill (1882) himself rejects.

An examination of the validity of Ragin's (1987:36-42) critique of the ideal methods is therefore methodologically unwarranted, and so is not examined in detail although the critique as formulated is certainly not without its own serious problems.[13]

The examination of notions of causation held in QCA and their comparison to those held by Mill (1882) therefore proceeds first with multiple conjunctural causation which incorporates the three notions of multiple causation, conjunctural causation and INUS conditions, followed by the notion of causal asymmetry.

Multiple Conjunctural Causation in QCA

The major critique of the Method of Agreement put forward by Ragin (1987:37-8), "particularly relevant to comparative social science" (Ragin 1987:37), is based on the argument that if there are two substitutable causes of an effect with some instances

[12] Since the notion of chemical causation receives little more than a mention by advocates of QCA, it's detailed examination is unneccessary to this study.

[13] For example, an erroneous assertion is made by Ragin (1987:36-42) with regard to the notion of conjunctural causation underlying *the ideal inductive methods* (which are presented as the extent of Mill's methods), so whilst the ideal Method of Agreement is permitted to proceed with the adoption of the notion of conjunctural causation in the examples, the ideal Joint Method is not, and its inability to perform in the context of conjunctural causation then becomes one of the reasons for its rejection.

exhibiting one cause with the effect and the other instances exhibiting the other cause with the effect, the Method of Agreement would eliminate both possible causes from consideration (Ragin 1987:37-38).

On this basis Ragin (1987) argues that "the method of agreement is completely incapacitated by multiple causation (which was known to Mill as plural causation)" (Ragin 1987:37, original parentheses), and concludes "In situations of multiple causation, therefore, the method of agreement is likely to yield incorrect results" (Ragin 1987:38).

Ragin (1987:41) also rejects the Joint Method on account of its "inconclusive nature…in situations of multiple causation" (Ragin 1987:41) and because it is "seriously incapacitated by conjunctural causation" (Ragin 1987:41).

Instead QCA, heralded as an example of "the ways in which Mill's methods have been superseded" (Ragin 1992:13), "develops a conception of causality that leaves room for complexity, referred to as "multiple conjunctural causation"" (Berg-Schlosser et al. 2009:8).

Multiple conjunctural causation is viewed as "QCA's strategic response" (Rihoux 2006:682) to the neutralisation of complexity by experimental design that occurs in most hard sciences, something that is argued to be usually unavailable in the social sciences (Rihoux 2006:682), and "is consistent with commonsense notions about how the world works" (Ragin 1987:25).

The term "multiple" refers to the number of causes for an outcome and the term "conjunctural" refers to the notion that each cause can be constituted by a combination of conditions (Berg-Schlosser et al. 2009:8).

More specifically, multiple conjunctural causation implies a notion of causality which encapsulates three types of complexity: that most often a combination of conditions constitute a complex cause that produces an outcome; that several different complex causes can produce the same outcome; that, depending on the conjunction of conditions in a complex cause, a given condition can have a different impact on the outcome (Rihoux 2006:682), sometimes positive, sometimes negative depending on

the other conditions in the conjunction (Berg-Schlosser et al. 2009:9; Goertz & Mahoney 2012:57).[14]

A major manifestation in QCA of the notion of multiple conjunctural causation is the analytical use of INUS conditions.

Mackie (1965) introduces INUS conditions with the illustrative example of a house fire which is extinguished allowing experts to investigate the cause and determine it was an electrical short-circuit. The short-circuit that started the fire is not a necessary condition for this particular house fire because a fire could have occurred from any number of other sources such as the overturning of an oil stove, yet the short-circuit is also not a sufficient condition capable by itself to cause this particular house fire because other conditions such as inflammable material also had to be present for the fire to occur (Mackie 1965:245).

Mackie (1965:245) asserts therefore that the short-circuit was an indispensable part of a combination of conditions that together constituted a complex condition that was sufficient, but not necessary, to produce the fire, and labels this type of condition an INUS condition which is an acronym for "an insufficient but necessary part of a condition which is itself unnecessary but sufficient for the result" (Mackie 1965:245).[15]

One of the features of INUS conditions is the analytical inclusion of both positive and negative conditions in a combination of conditions that constitute the sufficient cause (Mackie 1965:245).

QCA incorporates this feature in its notion of complex causality and the analytical use of INUS conditions:

"the uniformity of causal effects is not assumed; on the contrary, a given condition may, combined with different others, sometimes act in favour of the outcome, and sometimes, differently combined, act against it" (Berg-Schlosser et al. 2009:9).

[14] Goertz & Mahoney (2012:57) refer not to QCA specifically but to the qualitative tradition which they characterise as set theoretic, but their understanding of this type of variability of impact of a given condition is consistent with that of QCA. See also Ragin (1987:27) on multiple conjunctural causation – there has been no modification in this understanding of causality in QCA in over 20 years.

[15] Not to be confused with a necessary condition for all occurrences of the effect, although an INUS condition can also be a necessary condition in it's own right as well as an INUS condition if all the different sufficient causes contain it (see Mackie 1965:246-7). An INUS condition can be understood simply as a necessary part of a sufficient cause.

The analytical employment of INUS conditions in QCA is prevalent to the extent that "QCA solution formulas are full of INUS conditions" (Schneider & Wagemann 2012:79).

Mill (1882) in Relation to Multiple Conjunctural Causation

Mill (1882) explains that the assumption of singular exclusive causality is adopted specifically in order to simplify the exposition of the (therefore ideal) inductive methods, and acknowledges that this simplification provides the initial impression that the only analytical challenge is one of identifying a single cause (Mill 1882:537).[16]

Noting that if nature was in reality characterised by singular exclusive causality the investigation of its laws would be relatively easy, Mill (1882) asserts that in reality the same effect can be produced by different causes and in order to avoid any doubt clarifies that his conception of the same effect arising from different causes is that of an identical effect, not variants of the effect depending on the particular cause producing it (Mill 1882:538).

Mill's (1882) notion of different causes producing an identical effect therefore is consistent with the notions of multiple causation, equifinality and causal sufficiency in QCA, case methods and qualitative methodology (see Berg-Schlosser et al. 2009:8; Goertz & Mahoney 2012:11; Schneider & Wagemann 2012:5).

Mill (1882) however feels the need to clarify that this conception of a single cause not only relates to a "simple" cause constituted by a single condition, but also extends to a complex cause constituted by a combination of conditions, referred to by him as an "assemblage of conditions" (Mill 1882:537).[17]

[16] Although Mill (1882) actually examines five inductive methods, he refers to them as four in number, possibly because the Joint Method is viewed by him as a double application of the Method of Agreement and therefore not an entirely separate method in terms of the number of methods.

[17] Mill (1882:537) is specifically referring to the simplifying assumption of a single cause (not *condition*) for the ideal inductive methods which are 'ideal' by virtue of this very assumption. Contrast this to the erroneous assertion: "Although Mill stated that researchers should look for a single causal *condition* in which all instances agree" (Ragin 1987:36, emphasis added).

Mill's (1882) notion of an assemblage of conditions is therefore consistent with the notion of conjunctural causation in QCA (see Ragin 1987:13-15; Berg-Schlosser 2009:8; Schneider & Wagemann 2012:42-45).[18]

Mill (1882:538) nevertheless remains dissatisfied with the separate elaborations of his notion of different causes producing the same effect and his notion of the assemblage of conditions constituting a cause, perhaps because it might lend the impression that the two notions are mutually exclusive to one another, and so he clarifies that both notions should be conceived as being integrated with one another to provide a clearer understanding of causal reality in which an effect might be connected to several different causes, collections of antecedents, or assemblages of conditions.

Thus Mill's (1882) notion of causal reality is almost identical to that of multiple conjunctural causation in QCA with the only difference being that of the incorporation by QCA of INUS conditions into its notion of conjunctural causation.

The Problem with INUS Conditions in QCA

The inclusion of INUS conditions in QCA produces major causal-notional inconsistencies.

If we analytically accept that a given condition can act for or against the outcome depending on how it is combined with other conditions (see Berg-Schlosser et al. 2009:9), then we have to also accept that any given conditions when all positive combining to produce the outcome can also when they are all negative conditions still combine to produce the outcome. For example, both a present cause constituted by positive conditions ABC and its absent version constituted by negative conditions abc can equally produce the outcome, because ABC is a different combination to abc for each individual condition that is part of the combination of conditions, with the consequence that both ABC and abc can produce the outcome.[19]

[18] But not with regards to the incorporation of INUS conditions into the combination of conditions as will be discussed shortly.

[19] Conventionally in formal logic positive conditions are indicated in uppercase and negative conditions in lowercase.

Table 3.3	**Causal uniformity rejected** Both positive cause ABC and negative cause abc produce the outcome F
Cause:	Outcome:
ABC	F
abc	F

Advocates of QCA might be inclined to explain such cause variability by appeal to differences in context. After all, "A specific cause may have opposite effects depending on the context" (Ragin 1987:27).

It must be remembered however that in QCA contextual background beyond the conditions under consideration is by default assumed to be the same across all the instances under examination:

"At the outset of any investigation, an area of *homogeneity*, a "domain of investigation" must be defined that establishes boundaries within which cases are selected. Cases must parallel each other sufficiently and be comparable along certain specified dimensions. This is the meaning of the common adage that "apples and oranges" should not be compared" (Berg-Schlosser & De Meur 2009:20, original emphasis).

The QCA process of comparison generally, and truth table minimisation specifically, can only be justified on the assumption of contextual homogeneity, otherwise we have to accept that context may be rendering the causal status of conditions in relation to the outcome unstable, *beyond any causal variability arising from the configuration of which they are a part,* and therefore abandon the comparison and the Boolean minimisation process which relies upon this assumption. In QCA there is no relevant context beyond that constituted by the conditions under examination (see also Varone, Rihoux & Marx 2006:231).

Returning to QCA's assumption of a given condition as being in favour of the cause when positive or negative depending on the configuration to which it belongs, with the implication therefore that we also then have to accept that a positive 'cause' constituted by all positive conditions ABC or a negative 'cause' constituted by the

negative version of all the conditions abc can equally produce the outcome in the same contextual background, this has two important implications.

First, if both the presence and absence of a *cause* in the same contextual background can produce the outcome, this makes redundant "the search for causal regularities" (Berg-Schlosser et al. 2009:10) upon which QCA is based.

Second, in the QCA truth table minimisation process, a "key operation, which lies at the heart of csQCA" (Rihoux & De Meur 2009:35), positive and negative *conditions* are *implicitly* assumed to have causal uniformity in relation to the production of the outcome if the combinations of conditions to which they belong are otherwise identical, and it is this implicit assumption that provides the basis in the minimisation process for the removal of conditions from consideration on the grounds that if a condition is observed as being positive and as being negative in two otherwise identical combination of conditions, then this condition cannot be causally relevant to the outcome:

"…first principle of logical minimization: if two truth table rows, which are both linked to the outcome, differ in only one condition – with that condition being present in one row and absent in the other – then this condition can be considered logically redundant and irrelevant in producing the outcome in the presence of the remaining conditions involved in these rows. The logically redundant condition can be omitted, and the two rows can be merged into a simpler sufficient conjunction of conditions" (Schneider & Wagemann 2012:105).

Table 3.4

Causal uniformity assumed

Both positive condition C and negative condition c

cannot be causally relevant to the outcome, so only AB is relevant

Cause:	Outcome:
ABC	F
ABc	F
Minimised solution: AB	F

It needs to be emphasised that the demonstrated causal-notional inconsistency that arises in QCA as a direct result of the incorporation of INUS conditions into its notion of conjunctural causation is not based on any appeal to ontology.

Rather, the problem is one of causal-notional inconsistency and contradiction in the very assumptions upon which QCA proceeds: it relies on a mixture of both the rejection of the assumption of causal uniformity *and* its adoption.

As already highlighted, another serious implication of the incorporation of INUS conditions into QCA is that it proceeds in the search for causal regularities with the implicit acceptance that both a positive and negative cause can produce the same outcome in the *same* contextual background.

To understand how the explicit search for causal regularities amongst implicitly accepted causal irregularities, based upon both the explicit rejection and the implicit acceptance of the assumption of causal uniformity, might have occurred in QCA it is necessary to examine Ragin's (1987) reasoning behind the incorporation of INUS conditions into QCA.

The Source of the INUS Problem in QCA

Ragin (1987) introduces what are actually INUS conditions in the formulation of QCA as a feature of combinatorial logic (Ragin 1987:92), which is one of ten aspects of Boolean algebra considered "essential to its use in social science" (Ragin 1987:86).

Ragin (1987) explains that "Boolean analysis is combinatorial by design" (Ragin 1987:92), and uses an example with three potentially sufficient conditions designated by A, B and C and the outcome F to illustrate the use of combinatorial logic, and therefore INUS conditions, in QCA:

Table 3.5	**Boolean Analysis in QCA**			
Conditions			Outcome	Number of Instances
A	B	C	F	
0	0	0	0	9
1	0	0	1	2
0	1	0	1	3
0	0	1	1	1

Source: Part of truth table 4 derived from Ragin 1987:90

Ragin (1987:92) notes that from the examination of these particular truth table rows it appears that conditions A, B or C can individually produce the outcome F, but argues:[20]

"While it is tempting to take this short-cut, the route taken by Boolean analysis is much more exacting of the data. *This is because the absence of a cause has the same logical status as the presence of a cause in Boolean analysis….Boolean multiplication indicates that presence and absence conditions are combined*" (Ragin 1987:92, emphasis added).

The inclusion of negative conditions in a conjunction in QCA was therefore entirely technically driven.

Ragin (1987:92-93) initially acknowledges that the only conclusion that can be arrived at through the examination of a particular configuration of positive and negative conditions in a truth table row is that for the positive instance(s) to cause the outcome "it *may* be necessary for the other conditions….to be absent" (Ragin 1987:92, emphasis added).

Ragin (1987:92-3) then however, whilst referring to the importance of analytically including negative conditions because "the data might indicate that A causes F only when B and C are absent…" (Ragin 1987:93), takes a giant leap and starts analytically treating negative conditions as causally equivalent to the positive conditions on the

[20] With present denoted by 1 and absent denoted by 0, the first row indicates all conditions and outcome are absent, the second row that only condition A and outcome F are present, the third row that only condition B and outcome F are present, and the fourth row that only that condition C and outcome F are present, so each present condition appears individually capable of producing the outcome.

basis of the argument that this is consistent with the general orientation towards holism in case research.[21]

In QCA, the inclusion of negative conditions in configurations thus attains the status of a requirement claimed to be based on a *factual* understanding of causation:

"The *fact* that some conditions have contradictory effects depending on context further complicates the identification of empirical regularities because it may appear that a condition is irrelevant when in fact it is an essential part of several causal combinations in both its presence and absence state" (Ragin 1987:27, emphasis added).[22]

In this manner, the notion of causality in QCA, at least with regard to the inclusion of negative instances in a conjunction of conditions, is brought into alignment with the technical requirements of combinatorial logic and made amenable to Boolean manipulation, with QCA providing a welcoming home to Mackie's (1965) INUS conditions.

More than twenty years after its debut and under the mantle of causal complexity, QCA therefore steadfastly rejects the notion that causal uniformity applies to a given condition that constitutes part of a combination of conditions producing the outcome:

"the uniformity of causal effects is not assumed; on the contrary, a given condition may, combined with different others, sometimes act in favour of the outcome, and sometimes, differently combined act against it" (Berg-Schlosser et al. 2009:9).

The implication of course is that because ""QCA solution formulas are full of INUS conditions" (Schneider & Wagemann 2012:79), for more than twenty years applications of QCA have proceeded to search for causal regularities whilst implicitly accepting causal irregularity occurs in the given same context, with a mixture of both the rejection of the assumption of causal uniformity and of its acceptance.

[21] How the data might indicate that A produces F *only* when B and C are absent, rather than indicate that A produces F whilst B and C simply by coincidence happen to be absent is not discussed by Ragin (1987).

[22] There is here the appeal to contextual differences to explain cause variability in producing the outcome, but QCA proceeds on the basis of background contextual homogeneity - see prior discussion on the Problem with INUS conditions in QCA.

Mill's (1882) Solution in Relation to INUS Conditions

Whilst reiterating his rejection of singular exclusive causation as being representative of causal reality, Mill (1882) also introduces the conception of what can be referred to as the 'requisite concurrence' of antecedents to produce an effect:

"It is seldom, if ever, between a consequent and a single antecedent, that this invariable sequence subsists. It is usually between a consequent and the sum of several antecedents; the concurrence of all of them being requisite to produce, that is, to be certain of being followed by, the consequent" (Mill 1882: 402).

Thus Mill (1882) introduces the notion that all conditions which combine to constitute a cause are necessary, or "requisite", parts of the cause, a notion that is similar to that of INUS conditions to the extent that both Mill (1882:402) and Mackie (1965:253) agree that whilst in everyday language we might emphasise the causal role of a particular condition in a combination constituting the cause, no single condition can actually be assigned causal prominence:

Mill (1882:405) however notes the tendency to assign causal prominence to a particular condition based on its superficial conspicuousness, and argues that such misplaced insistence on the causal prominence of a particular condition in producing the effect also sometimes results in the consideration of a negative condition as a cause.

Mill's (1882) views are therefore in disagreement with Mackie's (1965) analytical inclusion of negative conditions in a combination of conditions producing the effect, which in terms of Mackie's (1965) house fire example incorporates "the absence of a suitably placed sprinkler" (Mackie 1965:245).

Mill (1882:405-406) explains that whilst both positive and negative conditions are required for the production of an effect, a negative condition merely signifies the absence of an opposing positive condition.

In terms of Mackie's (1965) house fire example then, Mill (1882) is essentially arguing that the water sprinkler is a positive 'opposing' condition to the positive 'propelling' conditions, the short-circuit and inflammable material that combine to produce the effect of the house fire. The absence of the positive opposing condition, the absence of

the water sprinkler as the negative condition, allows the combination of the propelling conditions to take their course in producing the effect.

It is therefore on the issue of the analytical inclusion of negative conditions in the combination of conditions that constitute a cause that Mill's (1882) views differs with that of Mackie (1965) and therefore of QCA's incorporation of INUS conditions.

Mill (1882:407) suggests that whilst the cause "is the sum total of the conditions, positive and negative taken together" (Mill 1882:407), the negative conditions can be "summed up under one head, namely, the absence of preventing or counteracting causes" (Mill 1882:407).

This is possible because, in contrast to the explicitly rejected notion of causal uniformity in QCA (see Berg-Schlosser et al. 2009:9), Mill's (1882:407) notion of complex causality is internally consistent and wholly based on the foundation of causal uniformity, with each cause viewed as having its own positive causal disposition, which sometimes comes into conflict with and is counteracted by that of other causes.

This allows us to "dispense with the consideration of negative conditions entirely, and limit the notion of cause to the assemblage of the positive conditions" (Mill 1882:411).

It is barely necessary to mention that given the critical causal-notional inconsistencies that arise in QCA because of its adoption of INUS conditions which incorporate negative conditions in conjunctions of conditions, and Mill's (1882) notionally consistent basis for the exclusion of negative conditions from conjunctions of conditions, that Mill's solution is by far the more appropriate.

Causal Asymmetry in QCA

In addition to the adherence in QCA to the notion of multiple conjunctural causation and the use of INUS conditions incorporating both positive and negative conditions, QCA rejects the notion of causal symmetry in favour of causal asymmetry:

"causality is not assumed to be symmetrical – rather, causal asymmetry is assumed, meaning that the presence and the absence of the outcome, respectively, may require different explanations" (Berg-Schlosser et al. 2009:9).[23]

Probably the most counterintuitive of the defining characteristics of casual complexity in QCA and set theoretic methods is that of causal asymmetry (Schneider & Wagemann 2012:81).[24]

An appropriate exposition of the difference between asymmetric and symmetric notions of causality can be framed in terms of the notion of causal sufficiency because advocates of QCA view multiple causation "a direct consequence of asymmetric causality" (Schneider & Wagemann 2012:78), and therefore equate the adoption of the notion of causal asymmetry as being synonymous with investigations into phenomena characterised by multiple causation (see Ragin 2008:15).

In phenomena characterised by multiple causation each cause is sufficient to produce the effect. When a cause is sufficient to produce an effect, the effect might still occur in the absence of this cause due to another sufficient cause. The test for causal sufficiency therefore is based on the expectation that when the sufficient cause is present the effect will always be present, whereas the absence of the sufficient cause will not always be accompanied by the absence of the effect and so this is not tested for. In consistency with the notion of causal asymmetry therefore, all that is required in the investigation of phenomena characterised by multiple causation and causal sufficiency is the examination of positive instances as defined by the presence of the posited sufficient cause in order to verify that the effect is always present.

If on the other hand multiple causation is absent in the phenomenon of interest, the only possible cause of the effect is considered jointly necessary and sufficient to produce the effect, and the test for this sole cause is based on the expectation that when the cause is present the effect will always be present *and additionally* when the cause is absent the effect will always be absent.[25] In consistency with the notion of

[23] This notion of causal asymmetry is static and different to that which relates to dynamic causal asymmetry (see Goertz & Mahoney 2012:64; Schneider & Wagemann 2012:81).
[24] Schneider & Wagemann (2012) use set theoretic methods as a general umbrella term for qualitative approaches based on set theoretic foundations of which they consider QCA to be "arguably the most formalized and complete set-theoretic method" (Schneider & Wagemann 2012:9).
[25] This is exactly what Mill (1882:542) does with the ideal Joint Method.

causal symmetry therefore, what is required in the investigation of a jointly necessary and sufficient cause is the examination of both positive and negative instances as defined by the respective presence and absence of the posited cause, in order to verify the respective presence and absence of the effect.[26]

Ragin (2008:2-3) argues that "because almost all social science theory is verbal in nature, it too, is fundamentally about sets and set relations" (Ragin 2008:2), but this "is not acknowledged by most social scientists today" (Ragin 2008:3) because "They are locked into the notion that set-theoretic arguments must be reformulated as symmetric correlational arguments before they can be "tested"" (Ragin 2008:3).

Ragin (2008:15) asserts that as a consequence "Set theoretic arguments are often erroneously reformulated as correlational hypotheses" (Ragin 2008:15) and that "This mistake is, in fact, one of the most common in all of contemporary social science" (Ragin 2008:15).

Ragin (2008:3) therefore argues that "set-theoretic arguments – the bread and butter of social science theory – should be evaluated on their own terms, that is, as (asymmetric) set relations and not as (symmetric) correlational arguments" (Ragin 2008:3, original parentheses).

In terms of the notion of causal sufficiency this translates to the argument that a hypothesis which specifies that a particular cause produces an effect should be evaluated on its own terms as a sufficient cause of the effect, by verifying that whenever the cause is present the effect is also present, without extending the hypothesis to incorporate the implicit unintended meaning that the cause is a jointly necessary and sufficient cause of the effect, the sole cause, which requires evaluation on the basis of symmetric notions of causation by verifying both that when the posited cause is present the effect is always present and that when the posited cause is absent the effect is always absent.

[26] See Goertz & Mahoney (2012: ch.5) for an overview of asymmetric and symmetric causality in the context of the qualitative and quantitative traditions.

The Problem with Causal Asymmetry in QCA

The key problem with the adoption of the notion of causal asymmetry in QCA is that this renders QCA unable to perform the counterfactual analysis of instances.

Of Mill's (1882) methods, only the Method of Agreement is operationally compatible with the notion of causal asymmetry. This is because the Method of Agreement investigates only positive instances rather than requiring a comparison of positive and negative instances in some form or another as with the other three methods briefly examined in this study, the Method of Difference, the Joint Method and the Method of Concomitant Variation.

Ragin (1987) notes that the Method of Agreement is "generally regarded as an inferior technique that is likely to lead to faulty empirical generalizations" (Ragin 1987:36) and also points out that Mill himself also cautioned against the liberal employment of the Method of Agreement in the favour of the Method of Difference whenever possible (Ragin 1987:38).

Ragin (1987:38) however rejects the use of the Method of Difference for observational investigations by comparative social scientists, arguing that "While longitudinal comparisons are often useful, they do not come close to conforming to the demands of experimental design" (Ragin 1987:38), and also because "Mill argued that when direct experimental manipulation is not feasible, investigators should use the indirect method of difference, a method which attempts to approximate experimental design with nonexperimental data" (Ragin 1987:38).[27]

Whilst the employment of the Method of Difference is thus rejected for use in observational investigations, it is instead considered "available to investigators as a theoretical method" (Ragin 1987:39), that is, as a method for conducting thought experiments (Ragin 1987:39).

Turning to the Joint Method, Ragin (1987:41) points out that the major difference between the Method of Agreement and Joint Method is that the latter "uses negative cases to reinforce conclusions drawn from positive cases" (Ragin 1987:41), but argues

[27] The indirect method is referred to as the Joint Method in this study.

that this presupposes a theory which allows for the identification of appropriate negative instances of the phenomenon of interest (Ragin 1987:41).

Ragin (1987:42) therefore asserts that "It is often impossible in case oriented inquiry to define such inclusive sets because an interest in specific cases or in specific categories of cases often motivates research. For example, it would be difficult to define the set that includes all negative instances of social revolution" (Ragin 1987:42), and concludes that "Because the selection of negative cases is arbitrary in the absence of strong theoretical or substantive guidelines, investigators who are interested in unusual or extreme outcomes tend to rely on the method of agreement" (Ragin 1987:42).

Thus, whilst Ragin (1987:40-1) notes Mill's advocacy of examining the negative instances in the Joint Method to reject competing hypotheses and that this capability proceeds on the basis of eliminating posited causes that are observed to be present in negative instances as defined by the absence of the effect, the Joint Method is nevertheless rejected as being unable to provide sound conclusions in the context of either multiple causation or conjunctural causation.[28]

For Ragin (1987) however, having thus rejected the Joint Method whilst also clearly recognising the potential analytical advantage of examining both positive and negative instances, the challenge of identifying appropriate negative instances for examination remains insurmountable:

"the set of non-revolutions is virtually infinite, and it would be difficult to construct a list of non-revolutions that would satisfy all critiques" (Ragin 1987:44).

Accordingly, in Ragin's (1987:85-102) exposition of the ten aspects of Boolean algebra considered "essential to its use in social science" (Ragin 1987:86) and thus incorporated into QCA, the very idea of the comparison and corroboration of positive and negative instances (i.e. of instances with present and absent outcomes) is prominent by virtue of its omission.

[28] For the Mill's (1882) discussion of how the Joint Method can be used to reject competing hypotheses see Mill (1882:542).

The negative outcome is instead analytically treated as incidental to the investigation into the causes of the given positive outcome, whilst acknowledging that its examination might still be useful:

"Once a truth table has been minimized and the different combinations of conditions associated with an outcome have been determined, it is *often useful* to assess the combinations of conditions associated with the absence of the outcome" (Ragin 1987:98, emphasis added).

However rather than advocating an empirically based examination of the negative instances themselves, Ragin (1987:98-99) instead advocates the use of De Morgan's law, a set of principles in formal logic and set theory which relate to procedures of logical negation, to 'logically construct' the result for the negative instances and their negative outcome from the result obtained from the empirical examination of positive instances and their positive outcome.

QCA therefore exhibits a clear aversion to the examination of empirical evidence in relation to negative instances: the Method of Difference is relegated for use in thought experiments even though it cannot be trusted to produce credible results with real empirical evidence; the Joint Method is considered unsuitable for any type of investigation on the basis that it is unable to negotiate conjunctural causation and multiple causation whilst it is also considered virtually impossible to identify and examine appropriate negative instances anyway; QCA's own formulation of analytical procedures make use of De Morgan's law to 'logically construct' a result for the negative instances and outcome from the result of positive instances, and is thus devoid of any directly related empirical evidence pertaining to the negative instances.

The claim therefore that "by employing counterfactual analysis, QCA permits a more nuanced analysis of the relationship between causal conditions and the presence and absence of outcomes" (Ragin & Rubinson 2009:26) is highly questionable. The relegation of the Method of Difference, which is solely a method of empirical evidence-based counterfactual comparison, for sole use in thought experiments in QCA does not equate to the employment of "counterfactual analysis" in the usually accepted meaning and usage of the term in the social sciences.

In QCA applications therefore if the empirical examination of negative outcomes does take place at all, it occurs through the same procedure as that employed for positive outcomes, but in complete analytical isolation from each other and without counterfactual comparison (see Rihoux & De Meur 2009:57). This analytical isolation of positive and negative instances is justified on ontological grounds, for example:

"if, indeed, as we claim, the occurrence and the non-occurrence of a phenomenon, such as the stability of democracy and the non-stability, constitute two qualitatively different events that warrant separate explanations, then it often makes sense to resort to different theories and hypotheses to explain those outcomes" (Schneider & Wagemann 2012:113).

Despite this problem, the notion of causal asymmetry is today promoted by advocates of set theoretic methods and QCA with much fervour (see Ragin 2008:7; see also Schneider & Wagemann 2012:112).

The Source of the Causal Asymmetry Problem in QCA

Due to technical reasons there is no other option but for QCA to adopt the notion of causal asymmetry. This problem stems from Ragin's (1987:86-87) decision to define the use of binary data as one of the ten essential aspects of Boolean algebra upon which QCA is formulated.

The dichotomisation of conditions and outcome into present and absent values occurs in QCA through an process referred to as 'calibration' in which theoretical knowledge and empirical evidence are considered in iterative fashion to arrive at the 'threshold' point that distinguishes whether a condition (or outcome) is present or absent in each of the instances under examination (Ragin 2008:78-80; Rihoux & De Meur 2009:39-44).

Dichotomisation however imposes the restriction of only being able to *appropriately* calibrate either the presence of a condition (or outcome), or the absence of a condition (or outcome), but not both presence and absence simultaneously. Rather, the calibration of the appropriate threshold for what constitutes presence automatically determines the threshold for what constitutes absence, and vice versa.

The problem is analogous to being able to decide only either how much water should ideally be in a glass, or how much air should ideally be in the glass, but not being able to achieve both ideals based on their own individual merit and without the constraint imposed by each upon the other.

Given that the calibration of the threshold occurs in relation to the positive value of the concept, for example democracy, the negative value acts as a 'conceptual catchall' for everything that is not democracy, and is therefore of little analytical relevance for the counterfactual comparison of positive and negative instances.

The fundamental issue is that of the inability of Boolean algebra in binary form as incorporated into QCA to allow the calibration of *conceptual* opposites in order to allow for meaningful counterfactual comparisons, for example of instances exhibiting democracy with instances exhibiting authoritarianism, if we take these to be conceptuals opposites, as distinct from simply conferring a capability to calibrate only one meaningful concept in isolation, for example democracy, and as a by-product produce its *logical* negation as a conceptual catchall for everything else, for example everything that is not democracy.

Ragin's (1987:86) exposition of the incorporation of the Boolean binary into QCA focuses solely on convincing us that the loss of information associated with dichotomisation "is typically not great" (Ragin 1987:86) or will not be a major obstacle "because many phenomena of interest to comparativists, both causes and outcomes, are already nominal-scale measures" (Ragin 1987:86).

There is a complete silence in this exposition with regard to the major cost of incorporating the Boolean binary and dichotomisation into QCA – the loss of the ability to conduct counterfactual comparisons.

The Solution to the Causal Asymmetry Problem

Since the casual asymmetry problem arises from the adoption of the Boolean binary which is a two valued logic, the solution is to jettison this and instead employ a three valued logic.[29]

Whilst three valued logic is by no means a recent innovation (for example see Putnam (1957)), it is less well known when compared to Boolean two valued logic. The major advantage of proceeding with a three valued logic is that the procedures of logical negation in particular can be brought into compatibility and alignment with the identification and examination of conceptual opposites.

It may be recalled that in QCA, based on the Boolean binary two valued logic, appropriate calibration occurs either for the presence of a condition (or outcome), or the absence of a condition (or outcome), but not both presence and absence simultaneously because the appropriate threshold that is established for presence automatically determines the threshold for absence, and vice versa.

Whilst this produces a logical positive and negative, for example the presence and absence of democracy, these are highly unlikely to coincide with conceptual opposites, for example democracy and authoritarianism. The logically negative 'absence of democracy' is not equivalent to the conceptually opposite 'authoritarianism'.

In contrast, by employing a three valued logic with positive, neutral, and negative values, the logically positive value threshold can be appropriately calibrated for one concept, for example democracy, the logically negative value threshold can be appropriately calibrated for the opposing concept, for example authoritarianism, both thresholds can be calibrated in relation to one another, and everything else that is deemed to fall outside of these opposite concepts, for example theocracy or monarchy, and therefore irrelevant to the analysis can be assigned a neutral value. The only thresholds that are determined automatically are those of the neutral value, which are of no analytical relevance. In this manner the logically positive and negative value thresholds are appropriately calibrated specifically for the conceptual opposites of interest, thus allowing an empirically based counterfactual comparison to proceed.

[29] All variants of QCA - csQCA, mvQCA and fsQCA are subject to the causal asymmetry problem (see Varone et al. 2006:231).

Returning to the analogy of water and air in the glass to further illustrate, instead of, as in QCA, being able to decide only either how much water should ideally be in the glass, or how much air should ideally be in the glass, but not both because one automatically determines the other, with a three valued logic we can decide the ideal amount of water as well as the ideal amount of air because now we can place oil in between the two. Of the three amounts in the glass, only the amount of oil is subject to automatic determination, depending on how much water and how much air is decided upon. Only water and air are of analytical relevance and we now have the ability to decide the exact amounts of both in the glass.

3.4.3 - An Assessment of QCA Innovations and Advancements vis-à-vis Mill (1882)

This section assesses the claims put forward by advocates of QCA in relation to its innovation and advancement over Mill's methods (see Berg-Schlosser et al. 2009:2; Mahoney 2007:135; Marx & Dusa 2011:104; Ragin & Rubinson 2009:26).

Innovations and advancements are examined in relation to two core areas of methodology: notions of causation and principles of practical application.

QCA vis-à-vis Mill (1882) in Notions of Causation

The methodological implications of the four core notions of causation in QCA have already been discussed at length. Therefore only QCA's innovations and advancements in notions of causation vis-à-vis Mill (1882) are examined in this section.

The notion of multiple conjunctural causation

The key claim to innovation and advancement over Mill's methods by advocates of QCA relates to the adoption in QCA of the notion of Multiple Conjunctural Causation which consists of multiple causation, conjunctural causation, and the incorporation of INUS conditions in which conditions can take a positive or negative value (see Berg-Schlosser et al. 2009:2-9; Rihoux 2006:682; Schneider & Wagemann 2012:79).

QCA's notion of multiple causation (see Berg-Schlosser et al. 2009:8; Schneider & Wagemann 2012:5), as already demonstrated is no different to Mill's (1882:538) Plurality of Causes, and QCA's notion of conjunctural causation (see Ragin 1987:13-15; Berg-Schlosser 2009:8; Schneider & Wagemann 2012:42-45) differs only with Mill's (1882:537) 'assemblage of conditions' due to QCA's inclusion of negative conditions in a conjunction.

Furthermore, QCA's integration of the notions of multiple causation and conjunctural causation to arrive at multiple conjunctural causation (see Berg Schlosser et at 2009:8) is paralleled by Mill's (1882:538) own explicit integration of the notion of the Plurality of Causes and the notion of the assemblage of conditions.

Given that the only difference between QCA and Mill (1882) in relation to the notion of multiple conjunctural causation is Mill's (1882:405-11) explicit examination and rejection of the inclusion of negative conditions in a combination of conditions, QCA's incorporation of INUS conditions which allow this inclusion represents no innovation over Mill's (1882:402) notion of the necessary (requisite) status of all the conditions in a combination of conditions which is identical to that of Mackie's (1965:253), it only represents a divergence in opinion as to the appropriateness of including negative conditions.

Therefore the notion of multiple conjunctural causation in QCA offers no innovation or advancement over the parallel notions of Mill (1882).

The notion of causal asymmetry

QCA's adoption of the notion of causal asymmetry does not constitute an innovation or advancement over Mill's (1882) notion of causal symmetry upon which three of the four inductive methods described in this study, that is, the Method of Difference, the Joint Method and the Method of Concomitant Variations, proceed.

This is because in terms of hierarchy in restrictiveness of assumption, an investigation based on the notion of causal symmetry, examining both positive and negative instances, still maintains the potential to yield a causally asymmetric result in relation to positive instances only, but an investigation based on the notion of causal

asymmetry, examining positive instances only, can never yield a causally symmetric result because this would require the examination also of negative instances.

The adoption of the notion of causal asymmetry in QCA therefore does not constitute an innovation or advancement over Mill's (1882) notion of causal symmetry, it simply represents a more restrictive causal assumption.

QCA vis-à-vis Mill (1882) in Principles of Practical Application

Having examined QCA vis-à-vis Mill (1882) in terms of notions of causation, and found that QCA offers no innovation or advancement in that respect, the principles of practical application of these notions are now examined, starting with multiple conjunctural causation and followed by causal asymmetry.

The practical application of multiple conjunctural causation

Ragin (1987), in the formulation of QCA, asserts with regards to the Method of Agreement that "Mill stated that researchers should look for a single causal condition in which all instances agree" (Ragin 1987:36). Whilst Ragin's (1987:36-42) critique of Mill's inductive methods incorporates the selective allowance of conjunctural causation in different methods in examples used to illustrate them, Ragin (1987) consistently maintains that the inductive methods are based on the assumption of a single cause.

Accordingly for Ragin (1987), having relegated the Method of Difference to exclusive employment in thought experiments, the Method of Agreement "is completely incapacitated by multiple causation" (Ragin 1987:37) whilst the Joint Method has an "inconclusive nature…in situations of multiple causation" (Ragin 1987:41).

QCA therefore is formulated with the capability to practically apply the notion of multiple conjunctural causation (Ragin 1987:121).

Mill (1882) however asserts even with regards to the *ideal* inductive methods that "The cause indeed may not be simple; it may consist of an assemblage of conditions" (Mill 1882:537). Contrary to Ragin's (1987: 36) assertion in relation to the search for a

single condition therefore, the assemblage of conditions, parallel to QCA's conjunctural causation, is already incorporated into the ideal inductive methods by Mill (1882).

The ideal inductive methods do however proceed with the assumption of a single cause (constituted by one or more conditions), but this is only "*in the first instance*, for the sake of simplification" (Mill 1882:537, emphasis added).

Mill's (1882:537, 543) simplifying assumption of a single cause made only *in the first instance* for the simplified exposition of the *ideal* inductive methods, is immediately jettisoned for the employment of the *practical* inductive methods in real world investigations.[30]

For Mill (1882:543), any practical application of the inductive methods with the Plurality of Causes operative requires no special method because the process of investigation is the same as for investigations into a single cause with the ideal inductive methods.[31]

The first practical avenue for investigating different causes of the same effect is based on the use of separate isolated investigations on different sets of instances (Mill 1882:543).

The second practical avenue for investigating different causes of the same effect presents itself with the discovery that the instances under examination have no common single antecedent associated with the effect, but that some antecedents are relatively common (Mill 1882:543-4).

Remembering that Mill (1882:537) also incorporates the notion of an assemblage of conditions in his definition of a cause, this practical employment of the inductive methods as described by Mill (1882) when "plurality may come to light in the course of collating a number of instances" (Mill 1882:543) is no different in principle of application to QCA's collation of particular combinations of conditions associated with

[30] But not for the investigation of social phenomena as will be discussed shortly in the section on Mill's rejection of the inductive methods for the investigation of social phenomena.
[31] The difference is therefore analytical rather than based on principle or method.

the outcome in separate truth table configuration rows (see Rihoux & De Meur 2009:44-47).[32]

Furthermore, Mill's (1882:544) advocacy to examine the possibility that commonly identified elements associated with the outcome are actually manifestations of a single cause when considered at a higher level of conceptual abstraction has similarities with the aim in QCA of producing more generalised and parsimonious minimal formula for the instances under examination through the employment of the logical minimisation of truth tables rows (see Rihoux & De Meur 2009:35-36).[33] The key difference is that whilst Mill (1882) is advocating conceptual abstraction where feasible, QCA seeks logical abstraction.

Mill (1882:544) points out that if this type of conceptual abstraction is not possible, then the identified antecedents can be considered possible "sufficient" causes:

"But if (as continually happens) we can not take this ulterior step, the different antecedents must be set down provisionally as distinct causes, each sufficient of itself to produce the effect" (Mill 1882:544).

This is no different in terms of principle of application to QCA's provisional setting down of sufficient causes at the end of the truth table logical minimisation process (see Schneider & Wagemann 2012:104).

Therefore, the assertion by advocates of QCA that of the fundamental ways in which QCA has superseded Mill's methods, "Most significantly, QCA permits the analysis of multiple conjunctural causation, addressing the greatest limitation of Mill's methods" (Ragin & Rubinson 2009:26), is hghly questionable.

For the reasons discussed, in terms of QCA's principles of practical application of multiple conjunctural causation there is no innovation or advancement over Mill (1882).

[32] Except for QCA's inclusion of negative conditions in the conjunction.

[33] Mill's (1882) conceptual abstraction has similarities with the "Ladder of Abstraction" (see Sartori (2009:21-37)) or the "ladder of Generality" (see George & Bennett 2005:243).

The practical application of causal asymmetry

QCA's practical application of causal asymmetry translates to the employment of Mill's (1882:543-4) *practical* Method of Agreement in order to investigate different sufficient causes for a given effect.

However, rather than proceeding on the Method of Agreement principle of examining instances that differ in every respect except for the given effect (see Mill 1882:482) which also applies to its practical version (see Mill 1882:543), QCA proceeds on the basis of examining instances that differ in every logically possible combination of conditions for the given outcome (see Schneider & Wagemann 2012:92-96).

The requirement in QCA to examine every logically possible combination of conditions however means that empirical observations need to be supplemented by thought experiments to create "imaginary" (Ragin 1987:39) instances exhibiting those logically possible combinations of conditions that are unavailable for empirical observation (see Ragin 1987:39; Ragin & Sonnett 2004:7; Schneider & Wagemann 2012:151-177).

QCA therefore proceeds in 'quasi-observational' mode (see De Meur et al. 2009:152-155).

Because Mill's (1882) practical inductive methods incorporate the analysis of both the assemblage of conditions and the Plurality of Causes, the adoption by QCA of the practical Method of Agreement supported by thought experiments represents no innovation or advancement over Mill (1882).

A Summary of QCA Innovations and Advancements vis-à-vis Mill (1882)

Given that QCA achieves no innovation or advancement over Mill (1882), either with regards to notions of causation or in terms of the principles of practical application of these notions, the only major innovation that advocates of QCA can seriously claim vis-à-vis Mill (1882) is QCA's use of Boolean logic, but this falls far short of delivering an advancement over Mill's (1882) practical inductive methods.

As already demonstrated, the very incorporation of Boolean logic into QCA is the reason why negative INUS conditions are included in combinations of conditions,

"because the absence of a cause has the same logical status as the presence of a cause in Boolean analysis" (Ragin 1987:92), with the critically defeating methodological implication that QCA actually proceeds in the explicit search for causal regularities amongst implicitly accepted causal irregularities based upon both the explicit rejection and at the same time implicit acceptance of the assumption of causal uniformity.

Additionally it has also been demonstrated how the incorporation of the Boolean binary into QCA eliminates the possibility of QCA making use of any form of *empirical* counterfactual analysis requiring the examination and corroboration of both positive and negative instances, with the methodological implication that QCA is restricted to the employment of Mill's (1882) practical Method of Agreement and without recourse to any of Mill's (1882) other practical inductive methods. In relation to Mill's other inductive methods, Ragin (1987:39) however acknowledges that the Method of Agreement is "generally regarded as an inferior technique that is likely to lead to faulty empirical generalizations" (Ragin 1987:39).

Having thus relegated itself to the least methodologically prowessed of Mill's (1882) practical inductive methods, and having adopted contradictory underlying notions of causation, QCA does not even retain the ability of the practical Method of Agreement to arrive at observational based conclusions of empirical association between posited causes and effect because it proceeds using a 'quasi-observational' mode of investigation using a mixture of both empirical observation and thought experiments (see De Meur, Rihoux & Yamasaki 2009:152-155).

Therefore, far from representing an advancement over all of Mill's (1882) inductive methods, or any of Mill's (1882) inductive methods, QCA actually proceeds by employing a retrogressed version of the practical Method of Agreement, which is, even without such critical retrogression, the least methodologically prowessed of Mill's (1882) practical inductive methods.

3.5 - Mill's (1882) Rejection of the Inductive Methods for the Study of Social Phenomena in the Favour of the Deductive Method and Hypothetical Method

This section provides an overview of Mill's (1882) rejection of the inductive methods for the study of social phenomena, followed next by expositions of the deductive method and the hypothetical method which Mill (1882) does advocate the employment of in this regard.

3.5.1 - Mill's (1882) Rejection of the Inductive Methods for the Study of Social Phenomena

For Mill (1882:544), it is the analytical challenge posed by the Intermixture of Effects that renders all the inductive methods "for the most part…quite unequal to cope" (Mill 1882:544).

Mill (1882) considers the Intermixture of Effects, in comparison with the Plurality of Causes, to be "still more peculiar and more complex" (Mill 1882:544) and "*the* principal part of the complication and difficulty in the study of nature" (Mill 1882:544, emphasis added).

The Intermixture of Effects refers to the causal complex phenomenon wherein "A concurrence of two or more causes, not separately producing each its own effect, but interfering with or modifying the effects of one another, takes place" (Mill 1882:544), and consists of two different modes through which this occurs in nature (Mill 1882:544).

The mode denoted the "Composition of Causes" (Mill 1882:459, 549) is "exemplified by the joint operation of different forces in mechanics" (Mill 1882:544), or more specifically "the phenomena of the communication of motion" (Mill 1882:458), such as when a body in motion is acted upon by several different forces, which can at times oppose each other to cancel each other effects (Mill 1882:458, 461), and whilst viewed by Mill (1882) in the context of nature as "the general one" (Mill 1882:462) and "by far the more frequent" (Mill 1882:545), Mill (1882) unreservedly asserts that "In social phenomena the Composition of Causes is the universal law" (Mill 1882:1066).

The second mode of causation in nature, exemplified by "chemical action" (Mill 1882:544) or "chemical combination" (Mill 1882:459), is one in which "the separate effects cease entirely, and are succeeded by phenomena altogether different, and governed by different laws" (Mill 1882:544), just as hydrogen combines with oxygen to produce water (Mill 1882:545), and is viewed by Mill (1882) in the context of nature as "always special and exceptional" (Mill 1882:462).

Mill (1882:461) considers these two different modes of "the mutual interference of laws of nature" (Mill 1882:461), to be "one of the fundamental distinctions in nature" (Mill 1882:461).

Mill (1882:553) suggests that investigations into phenomena in the Composition of Causes in which the effects are complex and result from the interaction of the effects of several causes can in principal be conducted either through the "a posteriori" method, consistent with the canons of the inductive methods, or through the "a priori" method, that is, deductively.

The a posteriori method investigates all concurrent possible causes which may produce the effect through a comparison of instances (Mill 1882:553-4). Investigations can proceed either through the collation of instances of the effect which is purely observational (Mill 1882:554), or alternatively in experimental fashion "by directly trying different combinations of causes, either artificially produced or found in nature, and taking notice what is their effect" (Mill 1882:557) which is based on the "hopes of ultimately hitting the precise combination which will produce the given total effect" (Mill 1882:554).[34]

The purely observational a posteriori method is ultimately rejected by Mill (1882) who asserts "No conclusions of value on a subject of such intricacy ever were obtained in that way" (Mill 1882:555) due to "the characteristic imperfection of the Method of Agreement, Plurality of Causes" (Mill 1882:555).

[34] These methods ultimately rely on the designs of the inductive methods, in particular the Method of Agreement and the Method of Difference, but here in the context of investigations of phenomena in the Composition of Causes are referred to by Mill (1882) as a posteriori, most probably to distinguish them from the application of the inductive methods in the investigation of phenomena in chemical causation. In essence, the discussion relates to the employment of these two inductive methods for the investigation of phenomena in the Composition of Causes.

The a posteriori method in experimental fashion is also ultimately rejected by Mill (1882:559) as “entirely unavailing” (Mill 1882:559) in its Method of Difference longitudinal version because causes other than the given cause will have been “operating during the transition” (Mill 1882:559), as well as in its Method of Difference cross-sectional version because “In phenomena so complicated it is questionable if two cases, similar in all respects but one, ever occurred; and were they to occur, we could not possibly know that they were so exactly similar" (Mill 1882:559).

Mill (1882:559-60) therefore concludes that "Any thing like a scientific use of the method of experiment, in these complicated cases, is therefore out of the question" (Mill 1882:559), and argues that this is especially so for the study of social phenomena such as that which occurs in history and politics, since "There, Plurality of Causes exists in almost boundless excess, and effects are, for the most part, inextricably interwoven with one another" (Mill 1882:560).

Mill (1882:562-3) therefore views the a posteriori method in the investigation of phenomena characterised by the Composition of Causes, that is, social phenomena, as “inefficient and illusory” (Mill 1882:562). Instead the (standalone) employment of the inductive methods is suitable only in relation to the investigation of other phenomena in nature that are consistent with chemical causation (Mill 1882:548-9).

For Mill (1882) in contrast, the a priori, deductive, method “which considers the causes separately, and infers the effect from the balance of the different tendencies which produce it” (Mill 1882:562) is “the main source of the knowledge we possess or can acquire respecting the conditions and laws of recurrence, of the more complex phenomena" (Mill 1882:562-3).

3.5.2 - The Deductive Method

Mill (1882:544) considers the Deductive Method to be the method of choice for investigations into phenomena in the Composition of Causes:

Mill (1882:459-61) argues that “mechanics is a deductive or demonstrative science” (Mill 1882:459) because we can predict the effect of a combination of causes, “whether real or hypothetical” (Mill 1882:459), using our prior knowledge of the effect

of each separate cause, “because they continue to observe the same laws when in combination which they observe when separate” (Mill 1882:459), and “even when the concurrent causes annihilate each other's effects, each exerts its full efficacy according to its own law” (Mill 1882:461).

The Deductive Method can be applied either in the identification of causal relationships, that is, to “prove laws of phenomena” (Mill 1882:574), as well as “to explain them” (Mill 1882:574).

Both of these applications of the deductive method are now examined.

The Deductive Method Applied in the Identification of Causal Relationships

The first application type of the Deductive Method aims "to find the law of an effect, from the laws of the different tendencies of which it is the joint result" (Mill 1882:563), or in other words, to identify and verify which combination of causes produces a particular joint effect with the use of prior knowledge relating to the separate effects produced by the separate individual causes.

This first application type of the Deductive Method consists of three operations: direct induction, ratiocination and verification (Mill 1882:563), which are now examined.

Direct induction

Prior knowledge of the separate effects of individual causes is ultimately inductive in origin because it "supposes a previous process of observation or experiment upon each cause separately; or else a previous deduction, which also must depend for its ultimate premises on observation or experiment" (Mill 1882:563).

The first step of the Deductive Method, direct induction, therefore produces the required knowledge with which to proceed to the second step of ratiocination. This knowledge is furnished by none other than the inductive methods (Mill 1882:564).

Regarding the selection of instances for examination in view of the analytical difficulties posed by the Composition of Causes, that is, the action of opposing or counteracting forces, Mill (1882) asserts "It is obvious that we can not expect to find

the law of a tendency by an induction from cases in which the tendency is counteracted" (Mill 1882:564), arguing that the laws of motion could never have been discovered through the observation of bodies kept at rest by opposing forces (Mill 1882:564-5).[35]

Mill (1882) further argues that even when the tendency is not fully counteracted but instead only modified by other causes “we are still in an unfavorable position for tracing, by means of such cases, the law of the tendency itself" (Mill 1882:565).

Therefore, Mill (1882:565) asserts that the separate effect of an individual cause "should be studied, if possible, in cases in which that tendency operates alone, or in combination with no agencies but those of which the effect can, from previous knowledge, be calculated and allowed for" (Mill 1882: 565).

Furthermore, "the best cases to select are those of which the circumstances can be best ascertained: and such are generally not those in which there is any practical object in view" (Mill 1882:567).

Mill (1882:565-8) points out that although there are certain areas of investigation which present exceptions, it is generally possible to examine the required simple instances “in which the action of each cause was not intermixed or interfered with, or not to any great extent, by other causes whose laws were unknown" (Mill 1882:568), and notes that when the premises for the Deductive Method have been furnished by the inductive study of such simple instances, investigations into the combination of conditions that produces a joint effect have “been attended with brilliant results” (Mill 1882:568).

It can be seen that for Mill (1882) the inductive methods are simply the means through which we produce knowledge of the separate effect of each individual cause as required for the second step of the Deductive Method:

“this experimentation is not intended to obtain a direct solution of any practical question, but to discover general laws, from which afterward the conditions of any particular effect may be obtained by deduction” (Mill 1882:567).

[35] The law of tendency refers to the separate effect that is produced by the given individual cause when unopposed by any counteracting force.

Ratiocination

Mill (1882:568) explains that once the required knowledge of the separate effect of each individual cause has been obtained through induction, we can proceed to the second step of the Deductive Method, ratiocination, wherein the joint effect of any given combination of these causes is now theorised through “a process of calculation” (Mill 1882:568).[36]

Mill (1882:568-9) notes the possibility of using mathematics or geometry to theorise the exact joint effect of a given combination of causes but considers this unrealistic because, apart from the mathematical complexities involved, "the effects are under the influence of so many and such shifting causes as to give no room either for fixed numbers, or for straight lines and regular curves" (Mill 1882:569).

Instead, Mill (1882:569) argues that we only need to formulate the theory in a manner that is specific to the circumstances and appropriately specifies what is required to satisfy the empirical verification of the theory:

"All that is essential in it is reasoning from a general law to a particular case, that is, determining by means of the particular circumstances of that case, what result is required in that instance to fulfil the law"(Mill 1882:569).

This idea is closely related to, and can be extended to explicitly clarify, the importance of formulating the theory in a manner that allows for context-specific empirical verifiability.

In its simplest form therefore, ratiocination can equate to the contextualised ‘calculated’ expectation, the theory, that the joint effect will be present for the given combination of conditions.

Mill (1882:570) identifies two types of questions that are the focus of the ratiocinations of the separate effects of individual causes: First for a given combination of conditions, what joint effect will follow, and second for a given effect, what combination of causes, if it existed, would be required to produce it.

[36] Mill (1882:571) refers to the output of the ratiocination as a theory.

Verification

Mill (1882:570-1) explains that Verification is the essential third step of the Deductive Method, "without which all the results it can give have little other value than that of conjecture" (Mill 1882:571), and allows us to bypass the analytical difficulties due to which the exclusive employment of the inductive methods were “set aside as illusory when applied to the laws of complex phenomena” (Mill 1882:570), that is, the problem of being assured in the investigation of phenomena characterised by the Composition of Causes that we have taken into consideration all material circumstances when "in every single instance a multitude, often an unknown multitude, of agencies, are clashing and combining" (Mill 1882:570).

Verification involves the assessment of whether the theory formulated in the second step of the Deductive Method, ratiocination, is consistent with "the results of direct observation wherever it can be had" (Mill 1882:571).

Mill (1882:571) argues that if the verification supports the formulated theory we can then generalise the conclusions to other unobserved instances: "we may safely trust to them in other cases of which our specific experience is yet to come" (Mill 1882:571), provided that “some” (Mill 1882:571) of the instances examined in the process of verification are “of at least equal complexity” (Mill 1882:571) to the unobserved instances being generalised to.

Mill (1882:571) points out however that if the formulated theory that a given combination of causes produces a particular joint effect is contradicted in verification by instances which exhibit the combination of causes but do not exhibit the joint effect, "we must be able to show (or at least to make a probable surmise) what frustrated it: if we can not, the theory is imperfect, and not yet to be relied upon" (Mill 1882:571).

Whilst Mill (1882) here is specifically referring to the defeat of the theoretically posited given complex cause in producing its joint effect, there is no reason why this principal should not also apply to a simple individual cause and its separate effect. They key issue is the development of a plausible explanation for the frustration of the connection between theorised cause and its effect.

Mill (1882: 572) also points out that the joint effect "should be described, in the most comprehensive as well as accurate manner possible; by collecting from the observation of parts, the simplest possible correct expressions for the corresponding wholes" (Mill 1882:572).

The formulation of the most comprehensive *description* of the joint effect with the simplest possible expression can be interpreted as involving a process of conceptual homogenisation and abstraction across instances, necessary to allow the meaningful comparison of instances. The principal can be illustrated by the distinction between conducting a comparison of instances in the use of cars, buses, trains which render the instances analytically different in this respect, to conceptually abstracting these to the use of a land based form of transport with render the instances analytically the same. The level at which concepts are abstracted to in order to homogenise them in this manner is very much dependent upon the research problem at hand.

Whilst Mill (1882:572) only states this principle here in relation to the joint effect, there is no apparent reason why the same principle should not apply to any elements under investigation and comparison across instances, such as conditions, causes and mechanisms.[37]

The Deductive Method Applied in the Explanation of Causal Relationships

Having discussed the employment of the Deductive Method in the identification of causal relationships (the laws of causation), we now turn to its employment for explaining causal relationships that have already been identified.

Mill (1882:574) elaborates the meaning he assigns to *explanation*. An individual fact is explained by pointing to its cause, the relevant causal relationship(s), as with the occurrence of a fire being explained by proving that a spark fell into a pile of combustible material (Mill 1882:574). Similarly, a causal relationship or uniformity in nature is explained by pointing to other causal relationship(s), of which the causal relationship being explained is a deducible case (Mill 1882:574).

[37] Mill (1882:572) uses the term "phenomena" in this discussion to refer to the joint effect, for example "the causes by which the phenomena are produced" (Mill 1882:571), and only refers to joint effects in relation to the required comprehensive descriptions: "the phenomena themselves should be described…" (Mill 1882:572).

A causal relationship may therefore be explained from, or resolved into, other causal relationships, and there are three distinct modes through which such an explanation can be developed (Mill 1882:574).

These modes of explanation are: first, the resolving of a joint effect into its separate individual causes and their individual effects (Mill 1882:574-5); second, the identification of an intermediate link between what was initially supposed the direct cause and its direct effect (Mill 1882:575); third, the subsumption of one causal law under another (Mill 1882:580).

These different modes of explanation are now examined.

The resolving of a joint effect

The first mode identified by Mill (1882:574-5) develops an explanation for the causal relationship between a joint effect and its complex cause by resolving this complex relationship into the simple relationships between the individual causes that constitute the complex cause, and their separate effects, "together with the fact of their co-existence" (Mill 1882:575).

This first mode of explanation is in essence a reversal of the step of ratiocination in the application of the Deductive Method to identify causal relationships which consists of the formulation of theory based on 'calculating' the joint effect to be expected from the combination of several individual causes and their separate effects. Here with the relationship between the complex cause and the joint effect already identified, we analytically deconstruct the relationship between the complex cause and its joint effect in order to explain this relationship in terms of its constituent individual causes and their separate effects.

The identification of an intermediate link between the cause and effect

The second mode of causal explanation elaborated by Mill (1882:575-580) is developed through the identification of an intermediate link or mechanism between what was initially supposed the direct cause and its direct effect, that is, the identification of "a fact caused by the antecedent and in its turn causing the consequent (Mill 1882:575).

Mill (1882:575-7) explains that with the initially supposed direct cause now shown to be a remote cause of the effect, "operating through the intermediary phenomenon" (Mill 1882:575), the causal explanation is developed by resolving the single causal relationship between the remote cause and the effect into two causal relationships which serially constitute the "sequence of phenomena" (Mill 1882:577), one that relates to the sequence between the remote cause and the intermediate link, and the other that relates to the sequence between the intermediate link and the effect.

Mill (1882:577) points out that when a causal relationship is resolved in this manner into its constituent sequences, each constituent sequence is "always…more general" (Mill 1882:577) than the causal relationship from which it was resolved. This is because "All laws of causation are liable to be counteracted or frustrated" (Mill 1882:577) and whilst either sequence can occur in instances independently of the other, both sequences *also* occur in instances together (Mill 1882:577). Either sequence will therefore occur in a greater number of instances both separately and jointly in total, when compared only to their joint occurrences in instances (Mill 1882:577).

Mill (1882:578) points out that the greater generality of the constituent sequences when compared to the causal relationship from which they are resolved also implies that these sequences are less subject to defeat, "they are more to be relied on" (Mill 1882:578).

In terms of what equates to the investigation into a sufficient or jointly necessary and sufficient cause (A) of the effect (C), Mill (1882:578) argues that because the tendency of A to produce C can be defeated through either the defeat of the tendency of A to produce B or the defeat of the tendency of B to produce C, the tendency of A to produce C is therefore "twice as liable to failure as either of those more elementary

tendencies" (Mill 1882:578), and therefore "the generalization that A is always followed by C is twice as likely to be found erroneous" (Mill 1882:578).

The identification of an intermediate link, the causal mechanism, between the cause (A) and effect (C) and the resolution of the causal relation into two sequences therefore offers an important analytical advantage, apart from developing an explanation for the relationship. Mill (1882) points out that not only does its resolution into two sequences alert us to the limitations of the causal relationship between A and C, the possible sources of its defeat, but also to what we should focus our attention towards when such defeat actually occurs in an instance so as to discover the reasons:

"The resolution of the one generalization into the other two, not only shows that there are possible limitations of the former, from which its two elements are exempt, but shows also where these are to be looked for. As soon as we know that B intervenes between A and C, we also know that if there be cases in which the sequence of A and C does not hold, these are most likely to be found by studying the effects or the conditions of the phenomenon B" (Mill 1882:578).

Therefore, with reference to the prior noted principle that when a theoretical connection between a particular cause and its effect is confronted with contradictory empirical evidence it can still be retained if a plausible explanation is provided for the defeat of the connection, the identification of the particular sequence between the posited remote cause and the effect that was responsible for the overall defeat of the connection is where the plausible explanation for this defeat is to be found.

The subsumption of one law under another

The third mode of causal explanation, in which causal relationships, laws, can be resolved into one another is what Mill (1882:580) refers to as the subsumption of one law under another and involves the process of "the gathering up of several laws into one more general law which includes them all" (Mill 1882:580), and is epitomised in Mill's (1882:580) view by the bringing together of terrestrial gravity and the central force of the solar system under the general law of gravitation.

Mill (1882:581) explains that it is mostly through successive steps consisting of "many distinct sets of experiments or observations, conducted at different times and by different people" (Mill 1882:581) that we can arrive at "laws so general as to be independent of any varieties of space or time which we are able to observe" (Mill 1882:581).[38]

Mill (1882:582) further clarifies that "The general law, in this case, is literally the sum of all the partial ones; it is a recognition of the same sequence in different sets of instances; and may, in fact, be regarded as merely one step in the process of elimination" (Mill 1882:582).

This type of elimination is illustrated by Mill (1882:582) with reference to the development of the law of gravity, the tendency of bodies exert a pull on one another, where the initial understanding that gravity was “a peculiar property of the earth itself” (Mill 1882:582) stood eliminated when celestial motion was later observed and recognised to correspond to earth’s gravitational tendency (Mill 1882:582). Key to this elimination was the examination of “a fresh set of instances in other parts of the universe” (Mill 1882:582).

This third mode of casual explanation in the Deductive Method, the subsumption of one law under another, in which several laws are gathered up into a single more general law can therefore be understood as a process of conceptual expansion that produces a general law that is conceptualised and specified at a higher level of abstraction and which is applicable to the operation of the phenomenon of interest in all the instances under examination.

Thus when Mill (1882:582) refers to the “process of elimination" (Mill 1882:582) in subsumption, he effectively refers to the elimination of conceptualisation at a lower level of abstraction in the favour of conceptualisation at a higher level of abstraction. Accordingly, in reference to the earth’s attraction of bodies to its surface he states:

[38] In Mill’s (1882) view the discovery of ultimate laws is the ultimate aim of scientific inquiry: “We are not sure that any of the uniformities with which we are yet acquainted are ultimate laws; but we know that there must be ultimate laws; and that every resolution of a derivative law into more general laws brings us nearer to them” (Mill 1882:598).

"it was not the earth, as such, that caused the motion or the pressure, but the circumstance common to that case with the celestial instances, namely, the presence of some great body within certain limits of distance" (Mill 1882:582).

'Earth' is therefore reconceptualised at a higher level of abstraction as the presence of some 'great body' in order to render the general law applicable to all the relevant instances.

This type of conceptual expansion however is viewed primarily by Mill (1882:583) with regards to bringing different classes of cases, that is, different case types, through the process of resolving two or more laws into one general causal relationship or law, and occurs:

"when, after the law has been shown to hold good in several different classes of cases, we decide that what is true in each of those classes of cases, is true under some more general supposition, consisting of what all those classes of cases have in common" (Mill 1882:583).

Given that such conceptual expansion proceeds on the basis of identifying commonalities amongst the different case types under examination which then results in reconceptualisation at a higher level of abstraction, Mill (1882:583) implicitly views the process involved as similar in principle to that of the inductive Method of Agreement but without the attendant complications that arise in generalisation from the examined to the unobserved, because the focus here is upon reconceptualisation for the examined *classes of cases* only.

The similarity in principle of the process of conceptual expansion with the use of the Method of Agreement to inductively identify commonalities across instances however presupposes first that only positive *case types* are examined in similarity with the Method of Agreement in which only positive *instances* are examined, and second that diverse *case types* are examined in similarity with the Method of Agreement in which diverse *instances* are examined.

There is no reason in principle however to limit the scope of the process of conceptual expansion to only positive case types, and there is no reason in principle why the

process of conceptual expansion cannot be applied to instances in order to conceptually define the case type they belong to in the first place.

As with different case types that become classified as belonging to one case type at a higher level of conceptual abstraction, so different instances can be classified as belonging to one case type at a higher level of conceptual abstraction.

Therefore, whilst the Deductive Method may be used in preference to the inductive Methods for investigations into phenomena in the Composition of Causes, there is no reason in principle why *any* of the inductive methods cannot be used fruitfully for investigations into concepts in order to appropriately expand and abstract concepts in relation to the instances under examination.

3.5.3 - The Hypothetical Method

An hypothesis is any supposition that is made, either without actual evidence or with insufficient evidence, in order to deduce conclusions of real fact which once validated as known truths support the idea that the hypothesis itself must be true or is at least likely to be true (Mill 1882:605).

Mill (1882:605) points out that in general, hypotheses tend to relate to either whether a posited cause produces an effect or the "mode of production" (Mill 1882:605), that is, *how* a cause produces the effect.

Mill (1882:605) argues that there "is probably no hypothesis in the history of science in which both the agent itself and the law of its operation were fictitious" (Mill 1882: 605), and so either the posited cause will be something that is real, that is "something actually existing in nature" (Mill 1882:611), and its mode of production of the effect is "merely supposed" (Mill 1882:605), or the posited cause is fictitious but its mode of production of the effect is supposed to accord with some mode of production that is similar to that in some known class of phenomena.

The major focus of the Hypothetical Method is in the identification of whether a posited cause produces an effect (see Mill 1882:605-625).

As such, with the Deductive Method applied to the identification of causal relationships consisting of three steps, that of induction, ratiocination, and verification, the Hypothetical Method replaces the first inductive step by hypothesising the causal relationship which is being reasoned from, and proceeds with this hypothesis to the employment of the second and third steps of the Deductive Method (Mill 1882:606-7).

Mill (1882:606-8) argues however that whilst hypotheses "enable the Deductive Method to be earlier applied to phenomena" (Mill 1882:606), the legitimate use of the Hypothetical Method requires that the third step of the Deductive Method, verification, "shall amount to, and fulfil the conditions of, a complete induction" (Mill 1882:607), that is "that it conforms to the canon of the Method of Difference" (Mill 1882:608).

Mill (1882:609) clarifies that deducing the known facts from the hypothesis only provides the positive instance, and emphasises that "It is equally necessary that we should be able to obtain…the negative instance" (Mill 1882:609).

Mill (1882:607) argues that this is because for the empirically verified conclusions of the hypothesis to support the idea that it is true, we have to be assured that a false hypothesis is not leading to a true result, which in turn depends on the assurance that no other law, that is, no other cause, than the one hypothesised can lead deductively to the same conclusions.

Mill (1882:608-9) reasons that if the counterfactual pair of instances differ in no other respect except that the positive instance exhibits the presence of both cause and effect, and the negative instance exhibits both their absence, this serves to indicate the hypothesised cause is the only cause of the effect in the positive instance.

There are however two issues that emerge from this reasoning.

First, Mill (1882) does not address the possibility in relation to the Method of Difference in observational mode that the relationship between cause and effect might be spurious even though the posited cause and effect might only be observed in instances as present together or absent together.

Therefore even when the result of verification is consistent with the hypothesis, the relationship between hypothesised cause and effect may be spurious on account of some unknown cause.

Second, one of the very grounds for Mill's (1882:559) rejection of the employment of the a posterior method in the investigation of phenomena in the Composition of Causes is the impossibility of identifying in observational mode a counterfactual pair of instances that meets with the strict requirement of the Method of Difference:

"In phenomena so complicated it is questionable if two cases, similar in all respects but one, ever occurred; and were they to occur, we could not possibly know that they were so exactly similar" (Mill 1882:559).

Mill (1882:609) now however, pointing to the example of Newton's observational investigations, asserts that whilst the positive and negative instances in the Hypothetical Method are obtained by a prior deduction rather than through an experiment "that is of no consequence" (Mill 1882:609) because the nature of the evidence that provides the counterfactual assurance that there is no other cause of the effect "is immaterial" (Mill 1882:609), rather, "it is enough that we have that assurance" (Mill 1882:609).

Mill (1882:609) therefore argues it "perfectly possible, and indeed is a very common occurrence" (Mill 1882:609) for an hypothesis at the start of an investigation to become, by the end of it, "a proved law of nature" (Mill 1882:609), but emphasises this is critically dependent on the ability "either by deduction or experiment, to obtain *both* the instances which the Method of Difference requires" (Mill 1882:609, original emphasis).

Due to the possibility of spuriousness in the Method of Difference observational mode and the virtual impossibility of identifying the counterfactual pair of instances in accordance with the strict requirement of the Method of Difference, Mill's (1882:609) optimistic assessment of the efficacy of the Hypothetical Method as an alternative to the Deductive Method applied to the identification of causal relationships, at least in the context of investigations in observational mode into social phenomena, appears to be highly unwarranted.

Mill (1882:609) does actually acknowledge the difficulty of obtaining a counterfactual pair of instances as per the strict requirement of the Method of Difference in the employment of the Hypothetical Method, but presents this as a problem that arises directly from the hypothesis containing an "unknown cause" (Mill 1882:609) which is "imagined" (Mill 1882:609) to solely produce the effect, and which therefore renders the selection of the negative instance impossible.

On this basis Mill (1882:609) argues that negative instances are only obtainable when we are either "seeking to determine the precise law of a cause already ascertained" (Mill 1882:609), in other words to identify the precise details of an effect being produced by its cause of which we already know, or when seeking to identify the particular cause of an effect from a selection of possible causes, "one or other of which it is already known to be" (Mill 1882:609).

Accordingly, Mill (1882:610) argues that the "most genuinely scientific hypothesis" (Mill 1882:610) is one for which "the effect is already known to depend on the very cause supposed, and the hypothesis relates only to the precise mode of dependence" (Mill 1882:610), which solely refers to identifying the "law of the *variation of the effect* according to the variations in the quantity or in the relations of the cause" (Mill 1882:610, emphasis added).

So whilst Mill (1882:605) earlier asserts that in general, hypotheses relate to the identification of either "the cause or mode of production" (Mill 1882:605) of the effect, that is, what the cause of the effect is or how it produces the effect, here he instead focuses entirely on "the precise mode of dependence" (Mill 1882:610) of the effect, that is its variation on the basis that we already know what the cause is, and proceeds in the discussion without any acknowledgement as to the possibility of employing causal hypotheses that relate to the mode of production of the effect, that is, how the cause produces the effect.

Given Mill's (1882:575-580) earlier elaboration of the identification of intermediate links between the cause and effect as a means of explanation in the Deductive Method applied in the *explanation* of causal relationships, Mill's (1882) neglect of examining the employment of hypotheses for investigations into the mode of production of the effect, which would necessarily involve an examination of the intermediate links

between cause and effect, probably arises from the fact that Mill (1882:606-7) views the Hypothetical Method as a replacement for the inductive first step of the Deductive Method applied in the *identification* of casual relationships rather than their *explanation*.

For Mill (1882:611-16) therefore, the key issue in the Hypothetical Method, squarely focused on the *identificatio*n of the relationship between cause and effect or variation of the effect, revolves around how we can best proceed in investigations when unable to fulfil the requirement for causal hypotheses that "the supposed cause should not only be a real phenomenon, something actually existing in nature, but should be already known to exercise, or at least to be capable of exercising, an influence of some sort over the effect" (Mill 1882:611), for which the necessary solution provided is that an assumed cause which is not apparently real phenomenon, such as ether (Mill 1882:616), "should be in its own nature susceptible of being proved by other evidence" (Mill 1882:612).

3.6 – The Formulation of Counterfactual Mechanism Analysis

In the formulation of the new comparative approach in response to the key methodological requirements arising from the first research question of the study, in order to provide clarity and transparency, key methodological principles guiding the formulation of the approach are summarised in the table on the following two pages.

Whilst the approach formulated is scoped and shaped by all these principles at a more general level, where there is a more directly traceable affinity of particular aspects of the approach with particular principles, this is made explicit during elaboration by indicating the relevant principle number in the table. The advantage gained is that each aspect in the formulation of the approach can be traced to the relevant principles summarised in the table, and these principles can then be traced conveniently back to the relevant writings of Mill (1882).

In the table, for principles that most directly relate to Mill's (1882) own statements, only page numbers are provided. Those principles which might be described as derived

from Mill (1882) are indicated as such in parenthesis, and principles that have been more fully developed are indicated as such in parentheses.

Table 3.6 **Methodological principals guiding approach formulation**

No.	Principle	Mill (1882):
1	The Method of Agreement is unable to infer causality upon the invariable connection between antecedent(s) and consequent even when this connection is consistent with notions of temporal precedence	481
2	A Method of Agreement investigation is unsuited to small-N investigations and is more compatible with large-N investigations	539-541
3	The Method of Agreement is more suited to elimination rather than confirmation of a posited cause	484
4	The assurance in relation to error requires the repeated examination of instances of the same case type	541
5	Error-supressed elimination adds to the evidentiary weight of a conclusion, not mere repetitive confirmation of what is already plausibly established	541-2
6	Instance selection and generalisation is predicated on case type (derived)	541-2
7	Empirical counterfactual comparison is required to infer causality upon the invariable connection between antecedent and consequent	486
8	The Method of Agreement, which only examines positive instances, is practically employed only for the identification of empirical regularity	647
9	Generalisation from the Method of Agreement is limited to that of empirical regularity	640
10	In the employment of the Method of Agreement the explanation as to why there is an invariable connection, an empirical regularity, between antecedent and consequent remains unknown	635
11	An explanation as to why there is an invariable connection between antecedent and consequent allows us to infer causality upon this connection	635
12	An explanation as to why there is an invariable connection between antecedent and consequent allows for the generalisation of the inferred causality to unobserved instances of the same case type as those examined	635
13	An explanation as to why there is an invariable connection between antecedent and consequent allows for the potential broadening of the scope of generalisation of the inferred causality to unobserved instances beyond the same case-type as those examined	635
14	Assuming that the only analytical challenge posed is that of the Plurality of Causes, and not that of the Intermixture of Effects, the Method of Agreement should only be employed when the other inductive methods are unavailable to us	539-544
15	The Method of Difference only requires the examination of two instances: one positive and one negative	539
16	The Method of Difference can be employed in causal contexts characterised by the Plurality of Causes	539
17	In the Method of Difference the counterfactual pair of instances must be apparently identical except for the given antecedent or given consequent of interest and for circumstances that are known to be immaterial to the result	484
18	The Method of Concomitant Variations arrives at a conclusion that relates to the relation of causal connection, rather than a relation of variation, between antecedent and consequent	497

19	The Method of Concomitant Variations can be employed to investigate monotonic connections between antecedent and consequent by comparing a relatively small number of instances at the extreme or the typical lower and upper limits of variation between antecedent and consequent (developed)	But see 498-502
20	The examination of only high and low values with the exclusion of middle values, allows us to analytically and logically treat these values as present and absent values (developed)	But see 496-7
21	Only positive (negative) conditions should be analytically incorporated into conjunctions of conditions for positive (negative) instances. More generally, only elements with a value that is in accordance with theoretical expectations are retained for analysis	407-411
22	The employment of a three valued logic allows for the empirical counterfactual analysis of logically and conceptually opposite instances	
23	The Composition of Causes causal-notional template is analytically consistent with: the necessity of each condition in a combination to produce a particular joint effect; the consistency of effects; the relevance of prior knowledge; the notion of causal context specificity; the dimension of time (direct & derived).	458-470, 535-549, 1066
24	Instances should ideally be selected for examination on the basis that they only exhibit the causal tendency of the individual cause on its own, or only otherwise when the individual cause is combined with other causes of which we know the contribution towards the effect	564-5
25	The best instances to select for examination are those of which the circumstances can best be ascertained	567
26	The theory should be formulated in a manner that is appropriate to circumstance and context specific empirical verifiability	569
27	Hypotheses should be formulated in terms of causal tendency due to the possibility of a cause being defeated in producing its effect by an opposing cause	551-2
28	When a theoretical connection between a posited cause and effect is confronted with contradictory empirical evidence it can still be retained if a plausible explanation is provided for the defeat of the connection	571
29	Conceptual homogenisation through abstraction to the appropriate level is required for the cross-case comparison of instances (developed)	572
30	Causal explanation can be arrived at (or eliminated) through the identification (or empirically verified elimination) of the mechanism(s) that link the posited cause to the effect (derived)	575-80
31	The plausible explanation for the defeat of a theoretical connection between a posited cause and effect is to be found in the identification of the sequence between the two that was defeated	578
32	Even for phenomena in the Composition of Causes, any of the inductive methods can be employed for investigations into concepts in order to appropriately expand and abstract concepts in relation to the instances under examination (developed)	580-3

The approach developed for this study, referred to as Counterfactual Mechanism Analysis (CMA), proceeds with a counterfactual comparison of instances that are both logically and conceptually opposite to each other in order to eliminate a theory positing that a particular cause produces an effect on the basis of the rejection of the posited explanation of how the cause produces the effect.[39]

In other words, CMA seeks to eliminate the inference of causality on the relationship between posited cause and effect on the basis of the rejection of the theorised mechanisms that link the two together.

CMA can be employed on this basis to eliminate a single theory or to arbitrate between rival theories positing different causes for the same effect, and can proceed with both quantitative and qualitative data.

The approach adopts the causal-notional template of Mill's (1882) Composition of Causes in which a cause can have its effect defeated by an opposing cause, with the analytical implication that there is no merit in seeking to either infer causality between posited cause and effect, or to reject it, on the basis of the empirical verification of constant conjunction between posited cause and effect, regardless of the number of instances examined. [40]

Rather, given that a cause can be defeated in its tendency to produce an effect at some point along the causal chain of mechanisms that links it to the effect, the implication for the rejection of causal inference is that an instance which exhibits 'strong' values for both posited cause and effect, whether measured quantitatively or qualitatively, should also exhibit correspondingly strong values, or at least compatible values, for the theorised mechanisms, and should never exhibit the opposite values that are reserved by the mechanisms of counterfactually opposite instances.[41]

[39] Of course the theory under consideration might posit more than one possible (simple or complex) cause but here the aim is to identify the most relevant cause the theory posits in relation to the research problem at hand. If the most relevant cause is then rejected on the basis of Counterfactual Mechanism Analysis, so the theory is eliminated.
[40] See principles 8, 9, 10, 23
[41] See Principles 19, 20, 21, 22, 24, 25, 30

The notion of context-specific causation is inherent to CMA because it proceeds with the elimination of theories based on the value of mechanisms, which in turn are subject to the context-specific operationalisation of mechanism concepts.[42]

Because the approach relies upon conclusions arrived at through the examination of mechanisms rather than empirical associations between posited cause and effect, it is practically limited to small-N investigations by virtue of the time-intensive demands of within-case examination.

That CMA arrives at its conclusions through the examination of a small number of instances however can be viewed as a distinct strength rather than a weakness because the approach proceeds on the basis of the elimination, rather than the 'confirmation', of theory.[43] Basing a CMA study on the examination of a single instance is inadequate because CMA requires a pair of positive and negative instances in order to be able to arrive at the conceptualisation of each mechanism condition through a process referred to as counterfactual concept corroboration to produce the logically and conceptually representative pair of counterfactual instances, as will be discussed further below in the elaboration of a key procedure in CMA, concept logical engineering. With regards to the elimination of a theory however, which is what is sought rather than its 'confirmation', CMA has an in-built feature for error handling that plausibly allows for a single instance amongst those examined to eliminate a theory.[44] A small number of instances is therefore required to be examined with the aim of finding the eliminatory instance amongst them.

For the elimination of single theories and arbitration between rival theories through the examination of mechanisms, CMA proceeds with what amounts to the integration of deductively extended and modified versions of the Method of Difference, the Joint Method, and the Method of Concomitant Variations combined with Mill's (1882) modes of deductive causal explanation, and as such is very different from small-N comparative methods, including QCA, which proceed on a foundation based on the inductive Method of Agreement to investigate associations between posited cause and effect across positive instances, without any empirical based counterfactual analysis,

[42] See Principles 26, 32
[43] See Principles 5, 6, 15
[44] This error handling feature will be discussed shortly.

and without a method-integral structured analysis of within-case processes linking posited cause to effect.[45]

CMA utilises a cross-case framework to structure the within-case counterfactual based investigation of mechanisms, causal explanation and causal inference.[46] For this reason CMA is considered a distinct small-N comparative *approach* rather than a new addition to the existing family of small-N comparative methods.

The key principles and procedures of CMA are introduced below with the aid of a simple running example, although it might be noted that the manner in which CMA is applied very much depends on the specific characteristics and requirements of the research problem at hand.

3.6.1 - Hypothesis Formulation

In the basic employment of CMA, the theory is specified in terms of sequential mechanisms, with each sequence hypothesised as causally producing the immediately next sequence, with values of the posited cause, mechanisms and the effect specified as being Present or Absent, High or Low.[47]

Hypotheses are specified in terms of the causal tendency to produce the immediately next sequence in the theorised causal chain.[48]

Using the simple example of a theory which posits that the cause *Income* produces the effect *Durable Goods Possession* and posits the attached explanation that this causal relationship occurs through the process of *Shopping*, hypotheses for positive instances might be formulated as:

1) *Presence of Income* tends to produce *Presence of Shopping*

2) *Presence of Shopping* tends to produce *Presence of Durable Goods Possession*

Or alternatively:

[45] See Principles 1, 2, 3, 7, 8, 9, 10, 11, 12, 13, 14, 16
[46] See Principles 29, 30
[47] See Principles 20, 22, 26, 30
[48] See Principle 27

1) *High Income* tends to produce *High Shopping*

2) *High Shopping* tends to produce *High Durable Goods Possession*

The negative hypotheses would be formulated simply by replacing the relevant positive prefixes with the relevant negative prefixes, for example Presence replaced by Absence and High replaced by Low. Causal sequences can also consist of a mixture of mechanism values specified as Present/Absent, High/Low, such as a Present valued mechanism tending to produce a High value in the next sequential mechanism, and might also involve reversed values in sequence, such as a Present valued mechanism tending to produce an Absent value in the next sequential mechanism and so on.[49]

For simplicity of illustration, the example only specifies one mechanism, *Shopping*, but there is no restriction in principle to the number of mechanisms that can be specified and analysed in sequence between the posited cause and effect - the number of mechanisms incorporated in sequence into the model does not affect the number of instances to be examined. This is because both positive and negative instances are selected on the basis of their hypothesis-compliant posited cause and effect values. The number of theorised mechanisms that link the two are therefore irrelevant to case selection.

3.6.2 - Operationalisation of Cause and Effect Concepts

The operationalisation of cause and effect concepts can take place as soon as hypotheses are formulated and can be relatively simple compared to the operationalisation of the mechanism concept. It may be noted however that under some circumstances, it may be appropriate to operationalise cause concepts in the same manner as mechanism concepts which undergo a different treatment, as will be discussed shortly.

Generally, cause and effect concepts should be operationalised as simply and concretely as theory, circumstances, context and the nature of the research problem

[49] The possible confusion that would arise as to whether the value of a condition or outcome is positive or negative with such alternating descriptions is avoided by the use of (1) to denote a positive value and (0) to denote a negative value in attachment to the value description, or alternatively by stating the positive value first in a phrase referring to the two values, for example Absent/Present indicates that Absent is the positive value for the particular condition being discussed.

allow, because it is on the basis of this specification that case types are defined and instances are selected for examination.[50]

In the CMA standard procedure, with both cause and effect operationalised as simply and concretely as possible, if a cause or effect is conceptually multi-dimensional, then a particular aspect of this multi-dimensionality that meets this criteria should be selected and operationalised, with a view to operationalising remaining aspects post-examination of instances.

Employment of Three Valued Logic

Whilst QCA proceeds with the two valued logic of Boolean algebra, CMA employs a three valued logic.[51]

The operationalisation of what is in two valued logic and everyday conventional meaning considered the mutually exclusive nominal character of the qualitative presence and absence of something, now with a three valued logic also excludes from consideration that which is not 'strongly' present and that which is not 'strongly' absent. Therefore a 'strong' presence is examined whilst a 'weak' presence is not and a 'strong' absence is examined whilst a 'weak' absence is not. Similarly, with concepts that vary quantitatively, CMA examines a High value and a Low value, and treats the middle value as irrelevant.[52]

The employment of three valued logic in CMA allows logical opposites and conceptual opposites to be brought into compatibility with one another.

Cause Concept Operationalisation

To illustrate the principles of qualitative cause concept operationalisation, in arriving at a 'strong' presence and 'strong' absence of *Income*, it is assumed there are four ordinally ranked aspects that are relevant to the cause concept *Income:*

[50] See principles 6, 26
[51] See Principle 22
[52] See principle 20

1) Income from assets

2) Income from employment

3) Income from social security payments

4) No income

With two valued logic, if an income from any source is taken to constitute *Presence of Income*, the first three aspects would constitute *Presence of Income* and the last aspect would constitute *Absence of Income*, or alternatively if *Presence of Income* is taken to be constituted by directly and personally earned income, the first two aspects would constitute the *Presence of Income* and the last two aspects would constitute the *Absence of Income.*

In contrast, with the three valued logic employed in CMA, in order to compare conceptually opposite instances, the 'strong' *Presence of Income* might be operationalised as constituted solely by Income from assets and 'strong' *Absence of Income* solely by No income.

If the cause concept is inherently nominal, that is, if there is no implicit ordinal ranking of its constituent aspects, then in CMA for complex causes constituted by a combination of conditions, the presence of all these conditions is taken as constituting the 'strong' Presence of the cause and the absence of all these conditions is taken as constituting the 'strong' Absence of the cause. This is in contrast to two valued logic which would treat the presence of the all of these conditions as constituting the Presence of the cause and every other logical combination of conditions as constituting its Absence.

With a nominal simple cause constituted by a single condition, the three valued logic of this approach can still be applied for strict dichotomisation into Presence and Absence, and it is only under these circumstances that the value of Presence and Absence is devoid of the notion of 'strength'.

Effect Concept Operationalisation

The operationalisation of the effect concept proceeds in accordance with the same principles as for the cause concept.

For example, with regard to the effect *Durable Goods Possession*, prior knowledge, theoretical or otherwise, might suggest that for the given context, people with Income from assets tend to have Present a particular type or class of durable good, such as an Advanced mobile phone, and will virtually always have Present another particular type of durable good, such as A chair.[53]

On the other hand, prior knowledge might suggest that, for the same given context, people with No income will almost always have Absent the advanced mobile phone and that the inclusion of the Absence of a chair in the effect concept operationalisation effectively equates to the selection of people who are homeless – they have no secure place in which to possess and retain possession of the chair. In this manner, the notion of 'strength' is incorporated into the Presence and Absence values of the effect.[54]

Operationalisation with Quantitative Data

Concepts of cause and effect that vary quantitatively are operationalised using quantitative criteria, but are then assigned High and Low values.[55]

For example in relation to the posited cause we might decide that what constitutes a *High Income* is An income of £10,000 per month or more, and what constitutes a *Low Income* is An income of £1000 per month or less. Ranges can also be explicitly specified for High and Low values, for example An income of £10,000 to £11,000 per month and An income of £1000 to £0 per month, or specific levels of income can be specified, for example Exactly £10,000 and Exactly £1000. For the effect we might decide that what constitutes *High Durable Goods Possession* is A market value of £30,000 or more and that *Low Durable Goods Possession* is constituted by A market value of £3,000 or less. As with the posited cause, the same principle applies to the effect with regards to ranges or exact specification.

[53] See Principle 23
[54] See Principle 23
[55] See Principles 18, 19, 20

Using both Quantitative and Qualitative Data

There is no reason why cause and effect concept operationalisations cannot be separately based on quantitative and qualitative data. For example, the cause *Income* could be operationalised with a positive value being *High Income* based on An income of £10,000 or more, and the effect could be operationalised with the positive value being *Presence of Durable Goods Possession*, based on the underlying qualitative possession of Both Advanced mobile phone and A chair.

3.6.3 - Pre-examination Operationalisation of the Mechanism Concepts

Because in CMA the definition of case types and therefore instance selection is usually based on posited cause and effect, and takes mechanisms into account only under special circumstances in accordance with unusual theoretical or study requirements, the operationalisation of mechanism concepts will usually proceed in two stages.

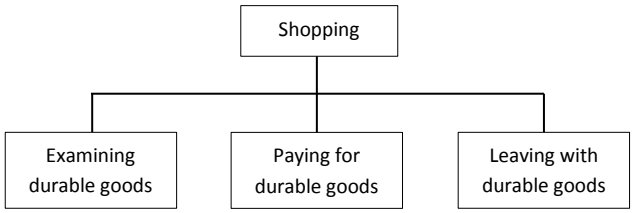
The first stage in mechanism concept operationalisation, referred to as pre-examination operationalisation, occurs alongside the operationalisation of posited cause and effect before the examination of instances and proceeds on the basis of operationalising the mechanism concepts with as much breadth and depth as theory permits. The mechanism concept on completion of the first stage is a 'floating' concept, subject to further adjustment in the second stage.

In practise whilst there can be several layers of nested sub-concepts, in the example here three aspects are taken to constitute the mechanism *Shopping* in its pre-examination operationalisation:

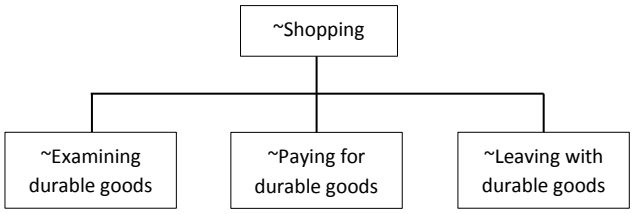
Positive Instances: all sub-concepts are present

Figure 3.1

Pre-examination Operationalisation



Negative Instances: all sub-concepts are absent (~ = Not)



3.6.4 - Selection of Instances for Assessing a Single Theory

Given the theoretical model has been developed and operationalised according to the above principles we can then proceed to the selection of instances for examination, based on the case types as defined by the cause and effect concept operationalisations.[56]

Because we use empirical verification to eliminate rather than to 'confirm' a theory, in principle we require as a bare minimum the examination of a single pair of positive and negative instances due to the need to conceptualise the mechanism conditions through counterfactual concept corroboration as elaborated upon in the section immediately below on concept logical engineering.[57]

However because more typically an application of CMA would likely examine rival theories with a view to arbitration, which in practical terms would require a small number of instances to be examined (further details are provided in the section below on rival theory instance selection and arbitration), the example uses a small number of instances for illustration of the key procedures of CMA.

[56] See Principle 6
[57] See Principle 5

In terms of the example, we could proceed to identify and select four positive instances exhibiting the posited cause *Presence of Income* with the effect *Presence of Durable Goods Possession*, and four negative instances exhibiting the *Absence of Income* with the *Absence of Durable Goods Possession*.

3.6.5 - Concept Logical Engineering

With the positive and negative instances selected and examined, this next stage proceeds with the post-examination operationalisation of the mechanism concept.

This process, referred to as concept logical engineering, produces the logically and conceptually representative counterfactual pair of instances and involves three steps: positive mechanism concept operationalisation to produce the logically representative positive instance, negative mechanism concept operationalisation to produce the logically representative negative instance, and counterfactual concept corroboration to produce the logically and conceptually representative pair of counterfactual instances.[58]

These steps are now discussed and illustrated with the aid of the running example.

Positive Mechanism Concept Operationalisation

In the first step, the mechanism concept of the positive instances is operationalised in order to produce the logically representative instance for the positive instances under examination.

In terms of the example, let us assume that each of the four examined positive instances exhibit the presence of all three of the pre-examination sub-concepts that constitute the mechanism concept of *Shopping.*

[58] See Principles 29, 32

Table 3.7	**The post-examination mechanism concept operationalisation for positive instances**		
	Examining durable goods	Paying for durable goods	Leaving with durable goods
Four positive instances	Presence	Presence	Presence
Representative instance	Presence	Presence	Presence

The logical combination of all these sub-concepts constitutes the post-examination operationalisation of *Shopping* for the logically representative positive instance:

Shopping =

Examining durable goods AND

Paying for durable goods AND

Leaving with durable goods

Negative Mechanism Concept Operationalisation

In the second step, the mechanism concept of the negative instances is operationalised in order to produce the logically representative instance for the negative instances under examination.

Here in the example, in contrast to the positive instances we might find that although three negative instances exhibit the Absence of all three of the pre-examination sub-concepts, one instance instead exhibits the Presence of the first sub-concept, Examining durable goods, with the Absence of the other two sub-concepts. This could be someone who is a 'window shopper' and who is therefore observed Examining durable goods.

Table 3.8	**The post-examination mechanism concept operationalisation for negative instances**		
Negative instances:	Examining durable goods	Paying for durable goods	Leaving with durable goods
Three negative instances	Absence	Absence	Absence
One negative instance	Presence	Absence	Absence
Representative instance	NULL	Absence	Absence

The logically representative negative instance is produced in this scenario by operationalising the mechanism concept on the basis of sub-concepts that are common to all instances and in complete accordance with theoretical expectations only. Sub-concepts in the post-examination operationalisation of mechanism concepts that happen to be common to the instances under examination but whose values are not in accordance with theoretical expectations are removed.[59]

Therefore, in this example, only two sub-concepts, Absence of Paying for durable goods and Absence of Leaving with durable goods constitute the post-examination operationalisation of ~*Shopping* for the logically representative negative instance:

~*Shopping* =

Absence of Paying for durable goods AND

Absence of Leaving with durable goods

Counterfactual Concept Corroboration

One of the key issues with concept operationalisation in QCA is that because operationalisation proceeds only by calibrating the positive instances under examination, this calibration is highly exposed to confirmatory bias.

In CMA the third step of the post-examination mechanism concept operationalisation imposes 'the discipline of the counterfactual' upon the separately arrived at logically representative positive and negative instances through counterfactual concept corroboration in order to ensure that any mechanism concept operationalisation that is not logically opposite as well as conceptually opposite is removed.[60]

In terms of the example what we would find is that whilst the logically representative positive instance exhibits the Presence of all three sub-concepts, the logically representative negative instance exhibits only the Absence of the second two sub-concepts, as shown in the following table.

[59] See Principle 21
[60] See Principle 22

Table 3.9	Counterfactual concept corroboration		
	Examining durable goods	Paying for durable goods	Leaving with durable goods
Representative positive instance	Presence	Presence	Presence
Representative negative instance	NULL	Absence	Absence
Representative counterfactual pair of instances	Sub-concept removed	Sub-concept retained	Sub-concept retained

Since both the positive and negative representative instances only have the second two sub-concepts in counterfactual consistency, the first sub-concept is removed altogether:

Shopping = Paying for durable goods AND Leaving with durable goods

~*Shopping* = ~Paying for durable goods AND ~Leaving with durable goods

The Principles Underlying the Process of Concept Logical Engineering

The process of concept logical engineering proceeds on the basis of operationalising mechanism concepts across instances in accordance with hypothesised expectations in relation to the production of the effect.[61]

This process involves an element of judgement because, with many layers of sub-concepts and a large number of indicators, it is likely to be *possible* to logically engineer the mechanism concepts in a manner that fulfils theoretical expectations for *all* the instances under examination, albeit in a logically and conceptually convoluted manner.

The key guiding principle therefore of concept logical engineering is to find the appropriate objective balances between the engineering of mechanism concepts in the most parsimonious form possible, in the most theoretically justifiable manner possible, and in as much accordance with theoretical expectations in relation to the production of the effect as possible, for as many of the examined instances as possible.

[61] See Principles 21, 29, 32. Concept logical engineering is also employed for any cause concept operationalisations that might have been left 'floating' in the first step of their operationalisation.

For this reason the use of existing analytical software for logical engineering is fraught with risk. The procedure in its treatment of data involves the application of a highly intensive and iterative focus on logical form, theory, hypotheses, concepts and operationalisation with raw data. The use of existing analytical software known to the researcher risks inhibiting effective application of the procedure as well as limiting its transparency and replicability. As such, the logical engineering procedure presented in the appendix tables was conducted 'by hand', and provides detail of both inputs and outputs to the extent that the reader can easily pinpoint which decisions he or she may have made differently when this detail is considered together with the conceptualisation and operationalisation details for each condition provided in Chapter 5.

A necessary element of objectivity is imposed upon the process of concept logical engineering by operationalising sub-concepts from the bottom layer upwards, one sub-concept at a time without examining other sub-concepts in the same layer, and one layer at a time without examining the layers above.

In this manner, concept logical engineering provides the theory under examination with 'the best possible chance' of objective empirical evidence-based 'confirmatory' verification. The process is deliberately invested with maximising confirmation bias, subject to the above considerations, on the basis that if after such facilitating treatment the theory is subsequently eliminated in the analysis stage, this elimination is all the more powerful and credible.

In contrast to the fulfilment of the strict unit homogeneity requirement of the Method of Difference, for which the counterfactual pair of instances must be exactly similar in all respects except for the cause and effect having opposite values and except for what is known to be immaterial to the result (Mill 1882:484), in CMA the logically and conceptually representative counterfactual pair of instances are produced first by incorporating during the pre-examination operationalisation every aspect that is considered theoretically relevant to the result, and then post-examination removing

every aspect that cannot be theoretically relevant to the result for the instances under examination in the given context.[62]

A key distinction then between the Method of Difference and CMA is that whilst the Method of Difference counterfactual pair of instances incorporate everything except what is known to be immaterial to the result, CMA proceeds with only those things that are empirically verified to be theoretically material to the result, with the implication that there may be things which are material to the result but which were not theoretically incorporated into the model.

The logically and conceptually representative counterfactual pair of instances in essence therefore equates to the assertion that "if the theory is actually true then this is what the counterfactual pair of instances would look like in terms of cause, mechanisms and effect, in the given context".[63]

Given that the instances under examination are selected in the first place because they exhibit 'strong' presence or 'strong' absence of posited cause with effect, an indication that there is something that is unknown but material to the result is then pointed to by the deviance of mechanism values in relation to the values of the posited cause and effect. If mechanism values contradict theoretical expectations, then this indicates that we do not know how the posited cause produces the effect or even if it does produce the effect.[64] This elimination occurs in the analysis stage which is where the overview of the approach turns to now.

3.6.6 - Analysis for Theory Elimination

Theory elimination is based on two principles: elimination through mechanism deviance and elimination though plausibility testing.

[62] See Principles 17, 21
[63] See Principles 21, 26
[64] See Principle 30

Elimination Through Mechanism Deviance

Having completed the logical engineering process and provided the theory with 'the best possible chance' of 'confirmation', if we then discover any instances in which the mechanism value has deviated from its theoretically expected value to the extent that it has 'crossed' the neutral value zone into opposite value territory, e.g. the value is Present or High when it is expected to be Absent or Low, then this provides a very credible basis for the rejection of the causal inference and explanation as to how the posited cause produces the effect, and therefore grounds for the elimination of the posited cause altogether from further consideration.[65]

In terms of the example, we would find an instance exhibiting:

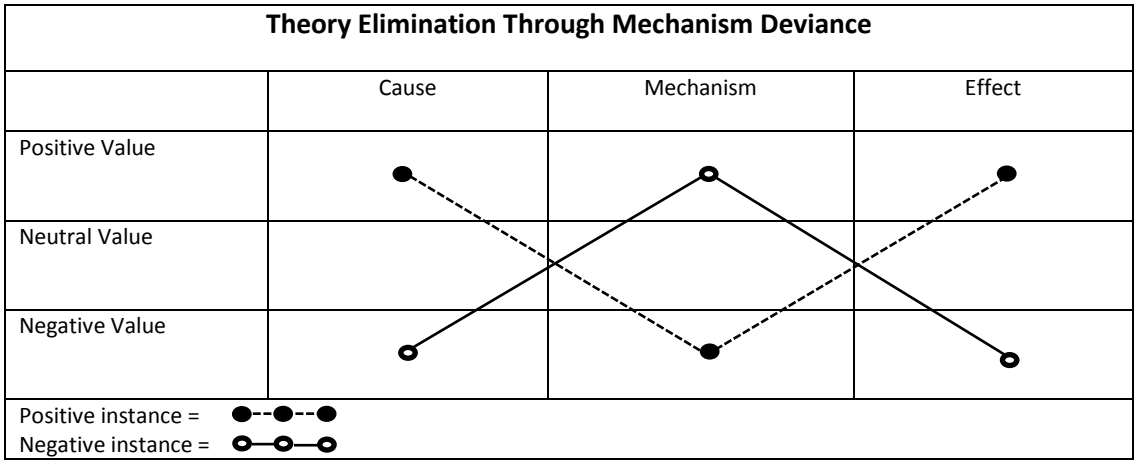
Presence of Income AND
Absence of Shopping AND
Presence of Durable Goods Possession

Or an instance exhibiting:

Absence of Income AND
Presence of Shopping AND
Absence of Durable Goods Possession

The first principle of elimination is illustrated diagrammatically as follows:

Figure 3.2



[65] See Principle 30

Elimination Through Plausibility Testing

If a theory survives elimination through mechanism deviance, the second principle of elimination is applied in the form of plausibility testing.

Because the logical engineering process operationalises each mechanism concept situated along the causal chain in isolation from one another, the coherence, consistency and plausibility of the resulting causal explanation provided by a sequence of mechanisms requires assessment. This assessment is referred to as plausibility testing.

Returning to the running example to illustrate the principle, all four positive instances exhibited the following:

Shopping =

Examining durable goods AND
Paying for durable goods AND
Leaving with durable goods

Now imagine that one of these instances happened to be a shoplifter and Did not Pay for durable goods. The positive mechanism concept operationalisation would remove Pay for durable goods as an aspect which was not common to all positive instances, thereby producing:

Shopping =
Examining durable goods AND
Leaving with durable goods

Given however that the counterfactual concept corroboration process removes Examining durable goods due to the window shopper amongst the negative instances, the mechanism concept *Shopping* would now be ultimately operationalised as:

Shopping =
Leaving with durable goods

The theory still survives elimination through mechanism deviance. A plausibility test

would however reveal that the mechanism *Shopping* fails to offer a plausible explanation of how *Presence of Income* produces *Presence of Durable Goods Possession* because whilst the operationalisation of *Shopping*, based solely on Leaving with Durable Goods plausibly explains how the effect *Presence of Durable Goods Possession* occurs subsequently to it, it fails to provide a plausible explanation of how the posited cause *Presence of Income* produces the mechanism *Shopping* operationalised solely now by the aspect Leaving with Durable Goods. The explanation and therefore theory would be eliminated by the plausibility test.

3.6.7 - Error Handling

One of the key issues with QCA is that because of its use of two valued logic, the dichotomised value assigned to cause or effect is highly exposed to error when the pre-dichotomisation values are situated close to the cut-off point, and such error in QCA has the potential to alter the results of the entire investigation (see De Meur, Rihoux & Yamasaki 2009: 148-152).

In contrast because in CMA the elimination through mechanism deviance occurs if the value of the mechanism in an instance under examination has crossed over the neutral zone and entered the conceptual opposite zone, this particular feature provides CMA with an in-built error handling capability.

In CMA, error of a minor nature is likely to be immaterial to the results because in the practical use of the approach, there will likely be many layers of nested sub-concepts, and the number of sub-concepts increases as we travel down these layers towards the ultimate indicators.

The possibility that layers upon layers of sub-concepts have been subject to error that is severe enough for the final value assigned to the mechanism to find itself erroneously crossing the neutral zone value and into opposite value territory is unlikely. What is more likely is that minor errors will either have no impact on the positive or negative value that is ultimately assigned to the mechanism or will erroneously shift the mechanism value to neutral.

A mechanism that is assigned a neutral value does not impact the results of the analysis, since a neutral value does not constitute grounds for theory elimination. Any mechanism exhibiting a neutral value in the theorised causal chain for a particular instance is simply treated as causally irrelevant and is not examined further for that particular instance.

Lieberson's (1991:309) assertion therefore of the necessity to adopt a probabilistic approach in order to allow for measurement error does not appear to apply to CMA, which has its own in-built design based on logic for dealing with this problem.

3.6.8 - Rival Theory Instance Selection and Arbitration

There are two considerations for rival theory arbitration. First, the basis upon which to select instances, and second, the basis upon which rival theories are eliminated.

The Selection of Instances

When CMA is used to arbitrate between rival theories positing different causes that produce the same effect, case types are defined and instances selected for examination according to the principles already described in relation to the treatment of a single theory, except for one major difference.

With two or more rival theories, whilst the definition of case types and hypotheses formulation for each theory is no different to that which occurs when there is only one theory being examined, the selection of instances for examination proceeds differently.

Ideally, positive instances should exhibit the positive values of all the posited causes with the positive value of the effect, and negative instances should exhibit the negative values of all the posited causes with the negative value of the effect.

In terms of the running example, if there were three rival theories positing three alternative causes of the same effect, say *Income* and the alternative *Inheritance* and the alternative *Lottery Winnings* posited to cause *Durable Goods Possession* then identifying one positive instance exhibiting positive values for each of *Income,*

Inheritance, *Lottery Winnings* and *Durable Goods Possession* and one negative instance exhibiting negative values for each of *Income, Inheritance*, *Lottery Winnings* and *Durable Goods Possession* would be required as a bare minimum.

However depending on the nature of the research problem, identifying instances which meet this criterion may prove very difficult and time consuming, as can be seen from the above example in particular with regards to the prospect of being able to identify a positive instance exhibiting each of the required positive values.

In practical terms therefore, bearing in mind the bare minimum requirement of having one pair of positive and negative instances as essential to allow for counterfactual concept corroboration to proceed, instances should be selected with regards to the posited alternative causes with a minimum requirement of having at least one positive or negative value for each posited cause that is *not* a floating cause condition, in alignment with the respective hypothesised values of the effect. With floating cause conditions (which are similar in treatment to mechanism conditions) because we do not know the formulation of the final conceptualisation and operationalisation of the condition, which only occurs post-examination of instances through the procedure of concept logical engineering with the data provided by the instances examined, we have no pre-examination criterion upon which to base the selection of instances in relation to these floating conditions.

Whilst the examination of rival theories therefore does not necessarily increase the required number of instances to be examined, the identification of a positive instance which exhibits each of the positive valued posited causes with the positive valued effect and a negative instance which exhibits each of the negative valued posited causes with the negative valued effect becomes more challenging and is likely to require the preliminary 'qualifying examination' of many more instances in order to find the relevant instances. In practical terms therefore the more rival theories there are to examine, the more likely it is that a small number of instances, rather than a bare minimum of a single pair of positive and negative instances, will have to be examined to meet the requirements discussed above.

It may be noted that the selection of instances in CMA proceeds on a very different basis to that of the quantitative tradition which prioritises the generalisability of

results to be obtained in the selection of instances (samples) to be examined. Because CMA seeks to eliminate the explanation of how a posited cause produces the effect, and this can occur through the examination of a single instance exhibiting a deviant mechanism value to that hypothesised in relation to the values of the posited cause and effect, the generalisation of the results to the wider population of interest plays no role in the selection of instances. The instances to be selected should however be as homogenous as possible in respect of circumstances not explicitly being examined in the form of conditions with the aim of providing some element of control for non-observed factors. Della Porta (2008:200) notes that this aim is common to experimental designs, statistical designs and small-N comparative methods alike in that they all pursue "the task of converting most of the variables into parameters in order to isolate the effects of the remaining variables" (Della Porta 2008:200). CMA's strategy for the selection of instances is based on the aim of selecting those instances which match the positive and negative valued ideal case types as specified in the models – it is based in principle on the purposive theoretical selection of instances rather than on the principle of avoiding selection biases in statistical analysis (see Della Porta 2008:212). The issue of generalisation in relation to CMA is elaborated upon further below.

Rival Theory Elimination

Arbitration between two or more theories under investigation proceeds according to two criteria.

First, a theory that is eliminated altogether because the value assigned to the mechanism in one or more instances under examination is of the opposite value to that which is theoretically expected automatically elevates rival theories that have withstood this elimination procedure.

Second, for rival theories that withstand elimination through mechanism deviance, the plausibility testing procedure provides the basis for further elimination.

Theories that withstand this procedure and are considered to offer equally plausible explanations of how the posited cause produces the effect go through to the next

procedure, which aims to improve the plausibility of surviving theories through model adjustment.

3.6.9 - Model Adjustment

Given that plausibility testing proceeds on the basis of assessing the coherence, consistency and plausibility of causal explanations across the theorised causal chain, the test also serves to highlight how remaining explanations might be adjusted to maximise their plausibility. The elimination of theories carries with it the consequence of removing certain instances from further examination, for example because these instances were compatible with only one possible theory which was then eliminated. Theories that survive elimination do not relate to all the instances that were examined, only a selection of them.

Model adjustment proceeds by identifying counterfactual consistencies amongst the instances to which the remaining theory relates, but which were not incorporated into that particular theory, but some other. If the incorporation of such consistencies from other models improves the plausibility of the explanation provided by the remaining theory, then the model is adjusted to allow this.

The manner in which model adjustment is applied for this purpose can be viewed in practical application later on in the study in chapter 6.

3.6.10 - Causal Inference and Generalisation

The discussions on causal inference and generalisation are organised in this one section in order to clarify the distinction in treatment of the two methodological issues in CMA.

Causal Inference

Causal inference is provided by the result of the small-N investigation, and this inference is not dependent in any manner on other unobserved instances in the population of interest. A weak association between posited cause and effect amongst

other instances in the population of interest is interpreted as arising from a prevalence of opposing causes acting to defeat the posited cause from producing its effect in those instances. This does not in any manner affect the inference of causality arrived at through the small-N investigation.

The result arrived at itself does not 'confirm' causation between posited cause and effect. Rather, if an hypothesised explanation linking the posited cause to the effect manages to withstand the two elimination procedures and has undergone model adjustment to maximise the plausibility of the explanation, the result is one which suggests that there is a possibility that the posited cause produces the effect and also suggests how, if it is a cause, it produces the effect.

The plausibility of this causal inference depends on the coherence of the explanation in the result for how the posited cause, through a sequence of mechanisms, produces the effect. The coherence of explanation in turn is determined by the procedure of concept logical engineering during which the initial breadth and depth of the pre-examination mechanism concept operationalisations are treated to provide the post-examination mechanism concept operationalisations.[66] It should be noted however that concept logical engineering produces the post-examination mechanism concept operationalisations in isolation for each mechanism. It is only later when the explanation is produced in the result that the coherence of the explanation provided through a series of mechanisms leading to the effect becomes apparent.

Causal inference therefore is based on the plausibility of the explanation as to how the posited cause produces the effect and, based on this plausibility, produces the inference that the posited cause *might* be a true cause of the effect whilst acknowledging that it is unlikely to be the only possible cause.

Generalisation

Generalisation of the result obtained through CMA equates to the transference, to other unexamined similar instances in the population of interest, of the explanation of how the posited cause produces the effect. This transference of explanation can only

[66] Possible issues are elaborated in the limitations section.

occur to similar instances in the population of interest for whom the posited cause and effect are either both positive or both negative, that is, only positive or negative instances.

The *relevancy* of the causal explanation to the population of interest however depends first on the proportion of instances in the population that are positive and negative instances in terms of the explanation and second on whether the key features and observable implications of the explanation are consistent with behaviour exhibited by these instances.

The first aspect of relevancy can be understood as follows. If there are only a minor proportion of instances in the population of interest which exhibit positive values for both posited cause and effect, and negative values for both posited cause and effect, then the relevancy of the explanation to the population of interest is minor. This situation can arise from two possible sources. First, the prevalence of the posited cause might itself be relatively low in the population of interest, and therefore very few positive instances are observed. There may be other more prevalent causes that produce the same effect and so what might be observed instead is the effect being produced in the absence of the posited cause. Second, whilst the prevalence of the posited cause might be relatively high in the population of interest, the prevalence of opposing causes might also be relatively high and might be defeating the tendency of the posited cause in producing the effect in a large proportion of instances. What might be observed is the presence of the posited cause in a large proportion of instances without the effect being produced.

Ultimately whatever the source, if the given population of interest that the explanation is scoped to exhibits a low frequency of positive and negative instances, the first aspect of the relevancy of the explanation to the population of interest is minimal, whilst if the majority are positive and negative instances then this aspect of relevancy is substantial.[67]

The second aspect of relevancy relates to how plausibly the explanation relates to the positive and negative instances in the population of interest, regardless of what

[67] This first aspect of relevancy is similar to that of 'coverage' employed in QCA (see Hellström 2011:74), but in CMA proceeds with differing underlying notions of causation and is applied to both positive and negative instances.

proportion of it they constitute. The assessment of this second aspect of relevancy therefore proceeds by examining the extent to which the key features or observable implications of the explanation are exhibited by these instances in the population of interest.

Both aspects of relevancy require an examination of similar instances in secondary data sources. One means by which this examination is facilitated is through the compatibilisation of certain respondent questions employed in the small-N investigation with those employed in secondary data, subject to the key guiding principle that the secondary data source should not be allowed to influence how the operationalisation of concepts occurs, which should be entirely theory driven. Rather, if particular respondent questions can be structured in a more compatibilised manner without sacrificing any of their essence and the meaning of what they aim to capture, this offers a possible advantage for the assessment of relevancy later on in the study.

3.6.11 - Key Methodological Advantages of Counterfactual Mechanism Analysis

Counterfactual Mechanism Analysis was specifically developed in response to the requirements of the first research question of this study: What are the major determinants and underlying causal mechanisms of differing fertility outcomes within the urban poor of Chittagong?

The response to this research problem required the development of an approach which combines within-case and cross-case analyses through a small-N investigation and incorporates the key features of theory and hypothesis testing, counterfactual analysis, rival theory elimination, case type analysis, combinatorial factor analysis, process tracing and the generalisation of results.

In terms of methodological design CMA appears to fulfil these requirements.

Other important methodological advantages in CMA which have already been elaborated include the capability to proceed with both underlying quantitative and qualitative data, the context-specific operationalisation of concepts and in-built error handling.

CMA as a distinct small-N comparative approach additionally enjoys two important methodological advantages over small-N comparative methods.

First, CMA proceeds on an underlying notion of causation which is closely aligned, in terms of what is methodologically expected to be empirically observed in the population of interest with regard to associations between posited cause and effect, to probabilistic notions of causation which inform the quantitative tradition, and rejects the deterministic notion of causation adopted by QCA which proceeds on the methodological expectation of constant conjunction between cause and effect.

Mahoney (2008) notes the key challenge of unifying small-N comparative methods and large-N quantitative methods due to their apparently contradictory claims about causation, and asks "How can causation be both a process that enables or generates specific outcomes in cases and a statistical likelihood that operates probabilistically within a population?" (Mahoney 2008:413) and suggests that a unified theory of causation should be able to provide the appropriate tools for translating the causal language used at the level of the instance into the kind of causal language used at the level of the population and vice versa (Mahoney 2008:413-4). Although Mahoney (2008) ventures the adoption of INUS conditions as a possible bridge, as elaborated earlier in this study the use of INUS conditions carries with it, at least for QCA, the indefensible methodological burden of assuming contradictory notions in relation to causal uniformity.

Ultimately whether the failure of a posited cause to produce an effect in a particular instance or instances is considered to occur due to the action of an opposing cause as in the Composition of Causes template adopted by CMA or whether this failure is considered to occur as a manifestation of probabilistic causation, what is methodologically expected and empirically observed are the same.

The key difference in the analytical implication of the adoption of these two notions of causation is that whilst the notion of probabilistic causation in essence 'assumes away' any requirement for further investigation as to why an effect was not produced by the cause as expected in certain instances, causal-notional alignment with the Composition of Causes template does call for an investigation in order to identify which opposing cause(s) prevented the cause of interest in exercising its inherent

tendency to produce the effect, and how these identified opposing cause(s) did this.[68] CMA identifies the relevant areas of focus along the causal chain between posited cause and effect which exploratory investigations into opposing causes can take as points of departure.

Second, strong compatibilities are to found between CMA and specific large-N quantitative approaches. CMA's compatibility with quantitative approaches applied in the identification of mechanisms, for example causal mediation analysis in the statistical tradition and the instrumental variables method in econometrics, is not entirely surprising because of the common causal focus on mechanisms. The relative advantage promised by the small-N route in terms of greater depth and discrimination of explanation informed the development of CMA. As a consequence CMA potentially offers this advantage to supplement large-N statistical and econometric studies in this regard.

CMA's compatibility with designs based on the experimental template, for example the potential outcomes framework including regression discontinuity designs, matching methods and randomised control trials (RCTs), is also not entirely surprising because both CMA and these quantitative approaches base causal inference on the counterfactual notion of causation (see Morgan & Winship 2007:4). Ultimately, this family of quantitative approaches proceed with what amounts to the expectation that some sort of discontinuity in the value of the posited cause will produce some sort of discontinuity in the value of the effect, and base causal inference upon the analysis of positive values of cause and effect variables above the discontinuity, the analysis of negative values of cause and effect variables below the discontinuity, and the analysis of the two in relation to one another.[69] CMA proceeds on the basis of the very same counterfactual causal principles and reasoning.

There are two key differences between CMA and these quantitative experimental designs, apart from obvious distinctions such as the analytical retention of variables in attachment with the instances to which they belong in CMA, the small-N/large-N distinction and technical differences.

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[68] See Principle 31

[69] The terminology employed varies with approach and sometimes application but the principles are the same, and are stated here in a manner which facilitates comparison with CMA.

The first key difference with quantitative experimental designs is that rather than 'relying' on a discontinuity to actually occur, for example due to a policy change or the implementation of a field programme or RCT, CMA proceeds by analytically 'producing' the discontinuity through the purposive selection of observed instances which exhibit 'strong' positive and 'strong' negative posited cause and effect values and relegating other instances to analytical irrelevance.

The second key difference with quantitative experimental designs is that whilst these designs proceed on the basis of producing causal inference through the counterfactual examination of posited cause and effect, CMA proceeds on the basis of eliminating the causal explanation through the counterfactual examination of the mechanisms situated between posited cause and effect.

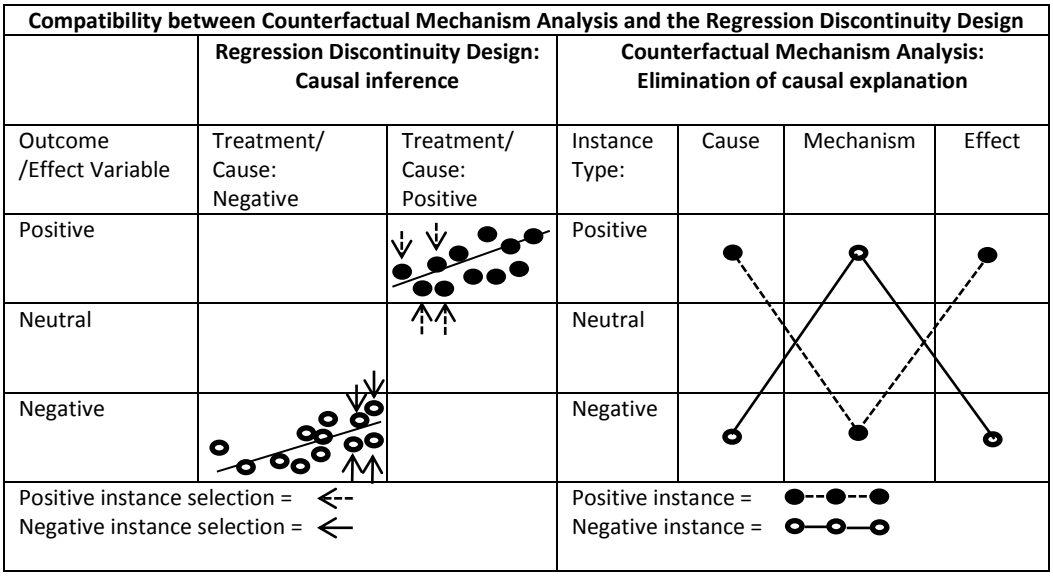
Due to the particular mixture of compatibilities and differences between quantitative experimental designs and CMA, including the fact that CMA can proceed with both underlying quantitative and qualitative data, CMA appears well suited for integration with these methods.

Because CMA produces context-specific operationalisations of mechanism concepts (and can also do so for any floating cause concepts or possibly even effect concepts depending on the nature of the study), it also offers the potential of providing a time and cost-effective small-N solution for investigating the potential applicability of the conclusions arrived at through such large-N investigations across different contexts before programme roll-out, identifying why a particular programme did not produce the expected outcomes, and suggesting alternative causal routes to the same outcome.

The compatibility of CMA with quantitative experimental designs is illustrated diagrammatically here in relation to the Regression Discontinuity Design, especially popular in both applied economics and programme evaluation.[70]

[70] The typical terminology of the Regression Discontinuity Design has been adapted to highlight compatibilities with CMA. Instance selection is illustrated for simplicity here for instances closest to the RDD threshold, but other criteria can apply depending on the details of the RDD and research problem. See Lee & Lemieux (2010) for an overview of Regression Discontinuity Designs, and Stuart (2010) for an overview of matching methods.

Figure 3.3



3.6.12 - Key Limitations of Counterfactual Mechanism Analysis

Although CMA appears to fulfil all the requirements of the research problem, is apparently an advancement over QCA in the ability to generate plausible causal inferences and is compatible for integration with quantitative approaches, it suffers from one major limitation.

Given that CMA proceeds on models based on prior knowledge relating to cause, effect and the mechanisms that link the two, it is restricted to the production of results that inevitably flow solely from this prior knowledge.[71] Two potential problems arise from this limitation.

First, if the theoretical explanation as to how a cause produces the effect is not relevant to the particular context in which the investigation occurs, whilst CMA would eliminate the theory on this basis, the cause might nevertheless be the actual cause of the effect in the given context, but happens to produce the effect through unknown context-specific mechanisms.

In terms of the running example, the post-examination mechanism concept operationalisation of *Shopping* was determined in scope by the pre-examination

[71] See Principle 23

mechanism concept operationalisation consisting only of aspects Examining durable goods, Buying durable goods and Leaving with durable goods.

Based on this pre-examination mechanism concept operationalisation which is appropriate for physical shopping, in the context of internet shopping the theory that *Income* causes *Durable Goods Possession* would be eliminated even though it would be an actual cause.

Second, even if the mechanism concept operationalisations are appropriate to the context of investigation, whilst CMA can identify *how* a posited cause is defeated in its production of the effect, through its ability to identify the mechanism sequence that is defeated, it is unable to provide an explanation as to *why* it is defeated, which requires an exploratory and in-depth inductive approach to identify the relevant opposing cause(s).[72] CMA does however pinpoint where along the causal chain of mechanisms the attentions of such a follow-up investigation should be focused.[73]

Overall, in view of the dependency on the appropriateness of prior knowledge to the specific context of investigation, CMA is probably most suited to applications where at least some of this prior knowledge is already available. As such, it appears best suited for employment in theory driven programme evaluations where the programme theory already contains elements of context-specificity, or alternatively in integration with, or subsequent to, large-N quantitative studies applied in the identification of mechanisms or based on the counterfactual experimental template, which might offer some valuable context-specific knowledge, at the very least in the form of suggestions as to *how* the posited cause might produce the effect.

[72] See Principle 28
[73] See Principle 31

Chapter 4. Theoretical Framework and Research Methods

This chapter first presents the theoretical framework of the study and then details the research methods undertaken. The conceptualisation and operationalisation of the conditions that make up each model and the outcome of the framework, Fertility Outcome, are discussed in detail in the next chapter.

The presentation of the theoretical framework consists of a descriptive overview of the separate models that together constitute the framework and how they relate to one another, a diagrammatic representation of the framework and the specification of framework level hypotheses.

The subsequent section on research methods details the various processes undertaken in relation to fieldwork activities, questionnaire design, couple selection, respondent interviews and data preparation.

4.1 Theoretical Framework

The theoretical framework consists of four separate models organised under the RWA framework.

The first three models are based on rival theories of fertility demand. These models are made up of causal chains that extend from hypothesised distal exogenous conditions through to the each model's outcome in the form of either the Wife's Fertility Demand, Husband's Fertility Demand or Couple's Fertility Demand. Each type of Fertility Demand constitutes a possible alternative for the conceptualisation of the framework level condition Readiness to Limit Fertility.

Model 1: Wealth Flows is based on Caldwell's (1976, 1978, 1982) wealth flows theory which emphasises the motivations of older patriarch males for high fertility. The model outcome is Husband's Fertility Demand.

Model 2: Security Assets is based on Cain's (1978, 1981, 1982) Children as Security Assets theory which emphasises the couple's shared security motivations for high fertility. The model outcome is Couple's Fertility Demand.

Model 3: Bargaining & Social Norms is constituted by two alternative hypothesised causal chains leading to Wife's Fertility Demand. The first causal chain is based primarily on theories related to gender, fertility and marriage bargaining, and the divorce threat model (e.g. Buss 1985; Cain et al. 1979; Manser & Brown 1980; McElroy & Horney 1981) which when taken together emphasise how elevated levels of women's bargaining power within marriage enable the actualisation of their latent demand for low fertility. The second causal chain is based primarily on social norms theories which emphasise the importance of the role of norms in the formulation of the Fertility Demand of women as well as men (e.g. Blake 1968; Casterline 2001; Montgomery & Casterline 1996).

The theoretical scope of Models 1, 2 and 3 extends up to, but not beyond, the formulation of the framework level condition Readiness to Limit Fertility. The value of Readiness to Limit Fertility is simply the inverse of the value for Fertility Demand as the model outcome, so that if for example Couple's Fertility Demand = Low, then Readiness to Limit Fertility = High.

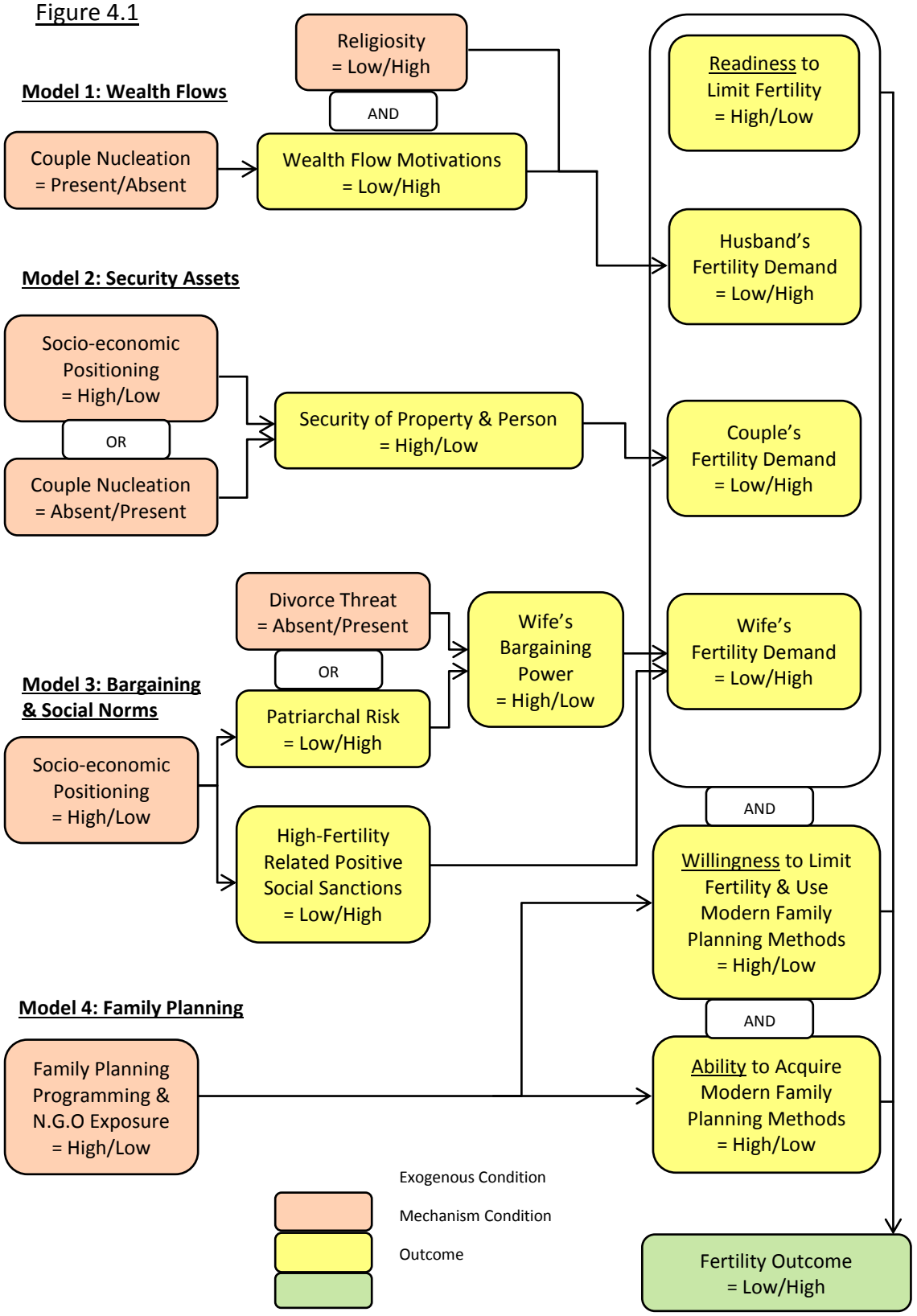
Model 4: Family Planning is based on ideational and family planning theories (e.g. Cleland et al. 1994; Easterlin 1975; Easterlin & Crimmins 1985), and contains the two model outcomes of Willingness to Limit Fertility and Use Modern Family Planning Methods, and Ability to Acquire Modern Family Planning Methods.

The ultimate dependent outcome of the framework, Fertility Outcome is also organised as the outcome of Model 4: Family Planning although it may be noted that Fertility Outcome can only occur when all three framework level conditions are considered together, that is Readiness = High/Low AND Willingness = High/Low AND Ability = High/Low = Fertility Outcome Low/High.

Together, these four models organised under the RWA framework as elaborated by Lesthaeghe & Vanderhoeft (2001) constitute the entirety of the hypothesised causal chains leading to the ultimate outcome of the framework, the Fertility Outcome.

Theoretical Framework

Figure 4.1



Framework Level Hypotheses

Positive Instances:

1) Readiness to Limit Fertility = High(1)
   AND
   Willingness to Limit Fertility & Use Modern Family Planning Methods = High(1)
   AND
   Ability to Acquire Modern Family Planning Methods = High(1)
   TEND TO PRODUCE
   Fertility Outcome = Low(1)

Negative Instances:

2) Readiness to Limit Fertility = Low(0)
   AND
   Willingness to Limit Fertility & Use Modern Family Planning Methods = Low(0)
   AND
   Ability to Acquire Modern Family Planning Methods = Low(0)
   TEND TO PRODUCE
   Fertility Outcome = High(0)

4.2 - Research Methods

This section details the research methods and related processes that were utilised in the study. Ethical approval for the research was granted by the Faculty Research Committee at the university.

The production of the Bengali language questionnaire from the English version of the questionnaire proceeded in three broad stages. The first stage involved the translation into a more formal Bengali. The second stage involved the modification of this translated version by different bilingual translators to a less formal everyday version of Bengali. The final stage involved the translators used in the second stage with the addition of Bengali speaking primary school teachers who lived in the same slum neighbourhood where the respondents were to be selected for interview, with a view

to further making the Bengali language in the questionnaire more appropriate to the context. The final Bengali version of the questionnaire was based on a simple form of everyday Bengali language that a typical child around the age of 10 living in the relevant slum neighbourhood would be able to understand. The final stage of questionnaire preparation involved a process of reverse checking the translation from Bengali back into English to confirm an appropriate translation had occurred. It may be noted however that the process of translation from English to Bengali was iterative in the sense that during all stages of translation, adjustments were made to the English versions of many questions as well, depending on the Bengali considered appropriate to capture the essence of the question. It might also be noted that the male and female interviewers were involved from the second stage of questionnaire translation and therefore became very familiar with the questions.

The slum neighbourhood where the fieldwork took place is situated in an urban area of Chittagong district and included a mixture of Hindu and Muslim inhabitants. All the respondents interviewed lived in the same neighbourhood, probably at most within ten minutes walking distance of each other.

For the selection of couples for interview, a separate team was organised to identify potentially suitable couples for interview based on their exhibiting key characteristics and the required values for select exogenous conditions with their Fertility Outcome. What was required as a minimum for each model with an exogenous condition being selected on was a single couple to exhibit hypothesis-compliant values for this exogenous condition with the Fertility Outcome.[74] Not all models had exogenous conditions that were selected on – some exogenous conditions were floating, requiring post-examination conceptualisation and operationalisation. Further details on the rationale underlying couple selection are provided in the next chapter which examines conceptualisation and operationalisation.

[74] The methodological basis underlying the couple selection strategy is detailed in Chapter 3: Methodology in the section on the Formulation of Counterfactual Mechanism Analysis, sub-section Rival theory instance selection and arbitration.

The key characteristics upon which couples were selected are as follows:

1. Age of husband and wife: couples with ages falling within the range of approximately 28 years to 40 years were sought because these couples were still within the typical life cycle stage between completed wanted fertility but with continuing exposure to unwanted pregnancies. Younger couples might still be in the process of adjusting their Fertility Outcome whereas explanations developed through the examination of older couples would extend the temporal distance from the contemporary fertility decision making context and not be as relevant to the younger generation still in their childbearing phase or still exposed to unwanted pregnancies, and therefore not as relevant to the family planning programme.

2. Age of youngest child: couples where the youngest child was at least 5 years old were sought on the basis that a youngest child of this age could reasonably be considered their terminal child, and therefore their Fertility Outcome could be considered terminal.

3. Religion: couples were selected on the basis of their religion, Islam or Hinduism, with the aim of achieving an even distribution of both Muslim and Hindu couples against both high and low Fertility Outcomes. By adopting this couple selection strategy, any explanation arrived at through the examination of these couples would have the advantage of being potentially applicable to both Muslim and Hindu couples in the population of interest.

4. First and only marriage: only couples who were in their first and only marriage were sought on the basis that previous or polygynous marriages might have the potential to alter fertility motivations in the current marriage.

The exogenous conditions that couples were selected on are as follows:

From Model 1: Wealth Flows, both the exogenous conditions Couple Nucleation (a partially floating condition) and Religiosity were selected on.

Couple Nucleation was selected on mainly in terms of whether or not the couple had been in residence with extended family over most of their childbearing phase, that is, the period after their marriage until the last successful childbirth.

Religiosity was selected on for Muslim couples based on whether the wife wore a Burka or not when out in public, and for Hindu couples whether the husband typically prayed two or more times a day, or less than that.

From Model 2: Security Assets, the exogenous condition Couple Nucleation (a partially floating condition) was selected on. The indicators of this condition are identical to that of Couple Nucleation in Model 1, but as may be noted from the diagrammatic representation of the framework the hypothesised value of this condition in Model 2 is opposite to that of Model 1 in terms of alignment with the value of the Fertility Outcome (in Model 2, Couple Nucleation Absent/Present is aligned hypothetically with Fertility Outcome Low/High), with the implication for couple selection that neither Model would ever be able to achieve a full set of couples (from the total number of couples selected) with the value of this particular condition aligned with their hypothesised value of the Fertility Outcome – the couples selected would have to be shared between these models in this regard. This did not present any methodologically related issues. The exogenous condition Socio-economic Positioning was not selected on due to its being a floating condition with many indicators.

From Model 3: Bargaining & Social Norms, the exogenous condition Divorce Threat was initially selected on, but the relevant indicator was very quickly dropped as a criterion for couple selection. The Divorce Threat indicator was based on the form of marriage in terms of whether the couple were non-relatives, relatives such as cousins, or whether they had had an exchange marriage whereby the wife's brother would have married her husband's sister. It was found however that both the latter forms of marriage were virtually non-existent in the context under consideration. As detailed in the next chapter, Divorce Threat was reconceptualised as being based on the indicator socio-religious possibility of divorce with different values assigned according to religious affiliation, Islam or Hinduism, which was a characteristic the couples were already being selected on. The exogenous condition Socio-economic Positioning was not selected on due to its being a floating condition with many indicators.

Model 4: Family Planning, the exogenous condition Family Planning Programming & N.G.O Exposure was not selected on due to its being a floating condition with many indicators.

Fertility Outcome: couples were selected on the basis of having a low Fertility Outcome of ≤ 2 living children or a high Fertility Outcome of ≥ 4 living children.

In terms of identifying suitable couples for interviews, approximately 100 couples underwent the 'qualifying process' in which they were asked a few select questions related to the key characteristics sought, their exhibited values for the exogenous conditions discussed above and their Fertility Outcome.

Of these couples, 13 including one for the pilot test of the questionnaire were selected for interview based on the criteria discussed above. The pilot test of the questionnaire indicated only minor issues with two questions which were then subsequently modified.

Two rooms located a few doors away from each other in the neighbourhood were acquired for conducting the Husband and Wife interviews. These rooms were made of brick and therefore offered more privacy when compared to the living quarters that the respondents typically resided in, which were usually constructed of tin sheet or other light materials.

Each couple was invited to attend the interview on a given day and time, and were assisted in finding the interview location by the team who had been involved in qualifying the couples for purposive selection.

An audio recording device was used during each informed consent process and interview.

The informed consent statement was provided verbally and after allowing respondents the opportunity to ask any questions they might have, their consent was received (and therefore recorded) verbally rather than in written format, as this was considered a more appropriate means of obtaining their informed consent given their typically low level of literacy and education.

During the respondent qualifying process, ID numbers were allocated for each couple being qualified. The anonymity of respondents selected for interview was further protected because the interviewers (who were not involved in the qualifying process) were requested not to ask their names, or any personal details beyond those required by the questions in the questionnaire.

The interviews of husbands were conducted by a male, and of wives by a female interviewer. The husband and wife for each selected couple were interviewed at the same time in the separate interview rooms, all except for the last couple whose interviews, due to operational reasons, were conducted one immediately after the other (with no opportunity for communication between the spouses before the second spouse's interview commenced).

Whilst the questions were standardised in the questionnaires, the questions were delivered to respondents in a flexible manner by the interviewers who at times tailored the question to maximise understanding by the respondents of what was being asked with the aim of correctly capturing their appropriate responses. The interviewers had been involved in the translation process of the questionnaire and therefore had a good understanding of the questions.

Interviewers were asked to skip questions for which during the main interview they suspected there might be a problem in understanding by the respondent. At the end of the main interview, each interview had what was referred to as a 'clarification' stage during which such questions were asked again, with the aim of clearing up any confusions and eliciting an appropriate response from the respondents.

At the end of this 'clarification' stage of the interview, at times additional questions regarding more general issues of relevance to the research were asked by myself through the interviewers acting as interpreters.

Once interviews were fully concluded, husband and wife respondents were individually provided with reasonable compensation for time, expenses and inconvenience.

Of the 13 couples who were interviewed, one wife effectively retracted consent during her interview, which rendered her husband's interview also redundant since the interviews of both wife and husband were required for analysis. The couple interview that was used for the pilot test resulted in the modification of two questions, with their new formulation occurring subsequent to the couple's interview. These questions would have to be asked of the couple, who would have had the opportunity to discuss the interview with each other. Due to the potential for the experience of the pilot interview they had undergone and their likely discussions with one another about the

interview to influence or alter the responses that might otherwise have been provided to these two questions, this couple was not recalled for interview and therefore not retained for analysis. A further 3 interviewed couples were not retained for the analysis because they exhibited the characteristics of polygyny, previous marriage and health issues preventing the birth of further wanted children, which rendered these couples unsuitable for comparison with the other couples. It may be noted that up to this stage only the key characteristics, the exogenous conditions specifically being selected on and the Fertility Outcome were examined in the data provided by the interviews in order to assess each couple's suitability for retention in the analysis and whether additional couples would be required for interview. In principle, any examination of the mechanism conditions at this stage would have introduced the inappropriate element of having a sense of what the results might look like. In practical terms because the mechanism conditions (and a number of exogenous conditions) were floating conditions with numerous indicators each and still subject to post-examination operationalisation through the logical engineering procedure, developing any sense of the results that might be arrived at was impossible anyway. The remaining 8 couples, based on their key characteristics and the values of the relevant exogenous conditions being selected on with the Fertility Outcome, were considered sufficient for the analysis to be conducted, which was fortunate because the time for fieldwork was running out.

With regards to the number of hypothesis-compliant couples in terms of value alignment of the relevant selected on exogenous conditions with the Fertility Outcome Model 1 had 3 couples; Model 2 had 1 couple; Model 3 had, after reconceptualisation of the relevant exogenous condition, 4 couples; and Model 4 had no conditions that were selected on. Of the 8 couples, 4 couples exhibited a low Fertility Outcome whilst 4 couples exhibited a high Fertility Outcome.

Subsequent to the completion of the interviews, each questionnaire of the relevant couples was checked against the audio recording of the interview (men's interviews by males and women's by females) in order to identifying mistakes the interviewers might have made in noting down responses.

Two respondents were contacted by telephone regarding a small handful of responses that were unclear from the recording, to verify that the relevant answers had been correctly noted in the questionnaires (most of the respondents had mobile phones), and one couple was briefly met in person again to clarify a few responses.

During the coding process (which is part of the concept logical engineering procedure) of the 8 retained couple questionnaires, further checks of the questionnaires against the audio recording of the interview (through translators) were made for a small number of questions, if for example the husband's and wife's noted answers in the questionnaires appeared to contradict each other, in order to verify whether this was occurring due to interviewer error in noting down the responses.

The data obtained for the cases through this process are brought together in the next chapter on conceptualisation and operationalisation.

Chapter 5. Conceptualisation and Operationalisation

This chapter examines in detail the conceptualisation and operationalisation of each condition and Fertility Outcome of each particular case for each model of the framework. Each model is examined in turn with a general format as follows:

First, a diagrammatic representation of the model and the hypotheses of each model are provided. Second, with each condition of the model examined sequentially, the theory and conceptualisation relevant for each condition is discussed. It may be noted that these discussions focus on the theory, conceptualisation and operationalisation of each condition in terms of its possible relationship with the next condition in the hypothesised causal sequence of conditions within each model. Third, for each condition either the details of its pre-examination operationalisation if it is a floating condition or the details of its standard CMA non-floating operationalisation if it is not a floating condition are provided with the reasoning for both types of operationalisation. Fourth, for those exogenous conditions relevant to the case selection criteria, the case selection notes detail which aspects of the conditions were used and provides the reasoning behind these decisions. Fifth, concept logical engineering notes provide an overview of the procedure for the condition under examination. Finally, for each model after each condition has been examined separately, a table is presented which summarises the logical engineering results for the values assigned to each condition for each case at the level of the model.

Taken together, the details provided in this chapter for each condition on theory and conceptualisation, the reasoning underlying operationalisation, case selection notes, concept logical engineering notes, and the presentation of the results of the concept logical engineering procedure both for each separate condition and then for all the conditions of each case at the level of the model together, allows for a clear understanding of how the values ultimately assigned to each condition for each case were arrived at and where they sit in relation to one another within each particular model.[75]

Each model is now examined in turn.

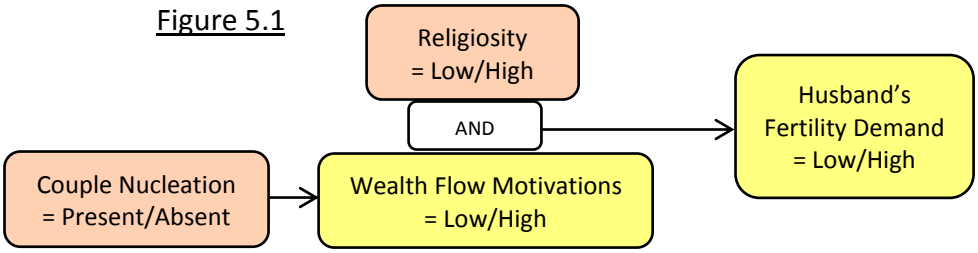
[75] The appendix tables provide the details that can be closely followed for those readers who may be interested. The ultimate value assigned to each condition can be traced back down to the original question asked, response provided and how the raw data was logically coded to produce the values for each individual indicator.

5.1 - Model 1: Wealth Flows

The conceptualisation and operationalisation of Model 1: Wealth Flows is now presented, starting with a diagrammatic representation of the model and the specification of hypotheses. Next, in separate sections for each condition, the conceptualisation and operationalisation of each condition is discussed in detail, with case selection notes when relevant to the condition, and logical engineering notes. Finally, a summary of the logical engineering results for the model presents all the values assigned to each condition of each case in tabular format.

Model 1: Wealth Flows

Figure 5.1



Hypotheses

Positive Instances:

1) Couple Nucleation = Present(1)
   tends to produce
   Wealth Flow Motivations = Low(1)

2) Wealth Flow Motivations = Low(1) AND Religiosity = Low(1)
   tend to produce
   Husband's Fertility Demand = Low(1)

Negative Instances:

1) Couple Nucleation = Absent(0)
   tends to produce
   Wealth Flow Motivations = High(0)

2) Wealth Flow Motivations = High(0) AND Religiosity = High(0)
   tend to produce
   Husband's Fertility Demand = High(0)

5.1.1 – Conceptualisation and Operationalisation of Exogenous Condition 1: Couple Nucleation

This section examines theory and concepts, operationalisation, case selection and the logical engineering for Exogenous Condition 1: Couple Nucleation. The three concepts of emotional nucleation, residential nucleation and economic nucleation are discussed separately to start with.

Emotional Nucleation

Caldwell (1976:353-4) argues that the westernised concept of the nuclear family, which carries within it the European concept of family obligations and relationships, is spread through the channels of mass media, for example through films, and mass education, for example through school books. Media based emphasis on sexual relationships ultimately strengthens the conjugal bond in marriage which first emotionally then economically nucleates the couple (Caldwell 1976:354). Caldwell (1976:347, 354-5) emphasises the thesis that emotional nucleation precedes, and is required for, the economic nucleation of the couple to occur.

The sentimental state of emotional nucleation is characterised by less concern with ancestors and extended family, and more concern with conjugal ties and the concentration of parental altruistic concern and increasing expenditures on children with a view to enhancing the future prospects of children, and even of grandchildren, with little expectation of wealth flows in recompense (Caldwell 1976:352). As such, the state of emotional nucleation is incompatible with the extended family economic system which also requires a parallel system of emotional obligations in order to function (Caldwell 1976:346).

Caldwell (1976:355) argues that a fair level of emotional nucleation is required for economic nucleation to occur, and a considerable degree of both are required before parents have the freedom to substantially increase expenditures on their children.

Residential Nucleation

Caldwell (1976, 1978) emphasises that there is no absolute causally relevant distinction between the conjugal couple living in close proximity to the extended family and living in the same residence under within a joint family system (Caldwell 1978:557-8) because building materials often determine if a single large family can be housed within the same structure or within adjacent or nearby structures, and family residential patterns can often be functions of the life-cycle with the conjugal couple only moving away from the joint family, often with their own children, when they have a business or farm of their own (Caldwell 1976:328-9). Caldwell (1978:553) therefore rejects the notion that the family system which determines economic advantage and demographic decision making is synonymous with the co-residential family. What is causally important for Caldwell (1976, 1978) is the extent of mutual obligation within the extended family (1976:328-9) and the sharing of economic activities (1978:553). Caldwell (1978:557-8) does however concede that co-residence probably renders it less likely both that the authority of the older generation will be eroded and that the younger generation will be able to establish "sufficiently strong conjugal links to encourage them to attempt to share in economic and demographic decision-making" (Caldwell 1978:558). Ultimately the conditions of stable high fertility and subsequent destabilisation are argued to lie mainly in the nature of economic relations within the family (Caldwell 1978:553).

Economic Nucleation

For Caldwell (1976) "the necessity for economic nucleation" (Caldwell 1976:346) in producing a reduction in fertility arises because whilst emotional nucleation is accompanied by the altruistic desire in the conjugal couple to increase expenditure on their children, the conjugal couple must be economically nucleated, that is, "fully in-charge of their family economy" (Caldwell 1976:346), so as to be able to shift the economic balance of expenditure within the family unit towards their children. Because of this, Caldwell (1978) argues that "It is not factories and steel mills that count in the reduction of fertility" (Caldwell 1978:568) but rather a change in modes of production from those which are based largely on networks of relatives to those

modes in which individuals sell their labour to complete strangers, that is, the replacement of a system in which the material advantages from both production and reproduction flow to people in the family, in particular older males in the extended family who can control or exert an influence on reproduction, by a different system in which those with economic power do not enjoy any advantages from reproduction or are unable to control it.

Operationalisation of Exogenous Condition 1: Couple Nucleation

Caldwell (1976:329) focuses narrowly on the theoretical relevance of the life cycle to family residential arrangements rather than on the direct relevance of the life cycle to fertility decision making.

For Condition 1: Couple Nucleation, the reference life cycle period of theoretical relevance spans the start of marriage until the last successful childbirth, that is, the childbearing phase, on the basis that this is the only period during which decision making with regards to the fertility of the conjugal couple, either by the couple themselves or the extended family, might have occurred with any consequence to the ultimate outcome of interest in the study, Dependent Outcome: Fertility Outcome in Model 4: Family Planning.

Bearing in mind Caldwell's (1976) thesis that “westernisation” produces emotional nucleation, which in turn produces economic nucleation, it is unnecessary to operationalise either westernisation or emotional nucleation in the examination of the wealth flows theory. Rather, economic nucleation can be viewed as a relatively concrete observable consequence and implication of the occurrence of both westernisation and emotional nucleation in the conjugal couple.

Although Caldwell (1976, 1978) expresses deep reservations of the appropriateness of the operationalisation of mutual obligation between the conjugal couple and extended family members in terms of nucleated vs. co-residential living arrangements, given that economic nucleation is characterised as the complete control by the conjugal couple of their own family economy (see Caldwell 1976:346), it stands to reason that economic nucleation could possibly only ever fully be achieved with the residential nucleation of

the conjugal couple, and could never fully be achieved under co-residential arrangements.

Residential Nucleation is therefore taken here, not as an indicator for mutual obligation between the couple and extended family members, but rather as a partial indicator for economic nucleation.

Employment Nucleation is taken as the other partial indicator of the economic nucleation of the conjugal couple on the basis that the fundamental theoretical difference in production systems relevant to fertility decision making, as defined by Caldwell (1978:568), is the difference between economic activity connected with the network of relatives who have material interests and influence over fertility decisions, and working for strangers with no interest or control over the fertility decision making of the conjugal couple.

Although Condition 1: Couple Nucleation, constituted by indicators Residential Nucleation and Employment Nucleation, is most strongly allied in concept to that of economic nucleation, the two are not synonymous because economic nucleation also serves as an observable consequence and implication of the couple's emotional nucleation which in turn is theorised to be the effect of westernisation (see Caldwell 1976).

Condition 1: Couple Nucleation therefore encapsulates the major conceptual constructs in the wealth flows theory with regards to the conjugal couple's circumstances of relevance to fertility decision making.

It might be noted that the operationalisation of Condition 1: Couple Nucleation is not subject to post-examination logical engineering because it is not a ‘floating’ condition. The theoretical and conceptual underpinnings as they are and without modification provide the strong basis for a plausible explanation for differences in fertility.

Case Selection Notes

Condition 1: Couple Nucleation with a particular emphasis on the indicator Residential Nucleation during the childbearing phase was used as a criterion in the purposive selection of respondent couples. Residential Nucleation was considered a more concrete criterion than Employment Nucleation in view of the possibility that employment, particularly in contexts of economic uncertainty such as that faced the respondents, would be more subject to frequent changes when compared to their residential arrangements.

Although testing of the wealth flows theory requires the selection of cases exhibiting Condition 1: Couple Nucleation (Present/Absent) with Dependent Outcome: Fertility Outcome (Low/High) in Model 4: Family Planning, the second model of the framework, Model 2: Security Assets requires the opposite values of Couple Nucleation (Absent/Present) exhibited with the same values for the Fertility Outcome (Low/High). It was important therefore to select a roughly even mixture of couples exhibiting these differently valued associations.

Concept Logical Engineering Notes

Logical engineering proceeded as per the operationalisation detailed in the relevant section above.

5.1.2 - Conceptualisation and Operationalisation of Exogenous Condition 2: Religiosity

This section examines theory and concepts, operationalisation, case selection and the logical engineering for Exogenous Condition 2: Religiosity. The specific issue of rationality and religion is discussed first.

Rationality and Religion

Caldwell (1976:324-6) notes the persistent strain in demographic transition theory writings that claims rationality comes only with the urban industrial society and a related strain which views pre-transitional society as brutish and superstitious, but argues this view of rationality is highly ethnocentric and laden with western values, for example by assuming that it is rational to maximise expenditure on members of the nuclear family whilst ignoring the fact that in many non-western societies expenditure on some family members beyond the nuclear family yields greater pleasure than expenditure on some within it. As such, fundamental choices and decisions are related to the social rather than the economic, and economic behaviour is rational only insofar as it is rational within the framework established by social ends (Caldwell 1976:326). Caldwell (1976:326) further notes the frequent use in demographic transition theory literature of the term 'economically rational' in the place of 'rational' and argues this usage provides the means of bypassing any assessment of 'social rationality' which carries with it the risk of having to agree that a certain mode of behaviour is actually rational in a given setting due to its compatibility with meeting the ends of community obligations or religious beliefs.

Caldwell (1976:327) therefore notes and rejects the strongly held view in many family planning movements that fertility behaviour in the developing world arises largely out of ignorance and for which the appropriate response is guidance and education. For Caldwell (1976:326-7) although social ends can differ, rationality, even economically rationality, exists in all societies in the pursuit of these ends. Therefore whilst Caldwell (1976, 1978) rejects the thesis of the classical theory of demographic transition that due to high mortality in pre-transitional societies a whole series of 'props' including religious doctrine, moral codes, laws, and community customs are needed to maintain

high fertility so as to avoid extinction (see Notestein 1945), the important influence of religion on fertility is acknowledged, but only with regards to religious sanction and support for the characteristics associated with the pre-transitional extended family as depicted in the wealth flows theory, for example the pyramidal family structure (Caldwell 1978:558), enjoining the young to take over harder labour (Caldwell 1978:561), and the veneration for the elderly and obeisance to them (Caldwell 1978:563). Caldwell (1976, 1978, 1982) and Caldwell et al. (1999) ignore the possibility that religion might directly influence the very process of economically rational calculation with regards to fertility outcomes, even though the wealth flows theory is developed and scoped to the geographical area which stretches from Morocco to Bangladesh with a particular focus upon Islamic groups in these areas (see Caldwell 1978:554).

Islamic religious beliefs espouse that economic provisioning for each person is ordained by God - as children are born they bring their share of ordained economic provisioning with them (Quran verse 17:31). As such, this belief might act to reduce parental incentives to limit fertility in the expectation that as more children are born so family income will be increased by God to meet the associated expense of raising each additional child, and might provide religiously inspired economically rational incentives for high fertility. Expectations of low levels of upward wealth flows therefore have to be accompanied with low levels of religiosity in order to provide economically rational incentives to limit fertility, and expectations of high levels of upward wealth flows when accompanied by high levels of religiosity would provide economically rational incentives for high fertility. Since similar beliefs may also be held amongst respondents affiliated with the Hindu religion, it is appropriate to incorporate religiosity into the wealth flows model.

Pre-Examination Operationalisation of Exogenous Condition 2: Religiosity

The reference life cycle period of theoretical relevance spans the start of marriage until the last successful childbirth since it is only the extent of religiosity during this period which might have had any consequence for Dependent Outcome: Fertility Outcome in Model 4: Family Planning.

The operationalisation of exogenous Condition 2: Religiosity incorporates the purdah related dress code of Muslim women, and is only relevant in terms of religiosity to these women yet is captured for both Muslim and Hindu women so that the dress code of Hindu women can serve as a context-specific benchmark to distinguish between cultural norms of dress code for women respondents generally and Islamic based dress codes adopted by the Muslim women respondents. The frequency of prayers performed by both Husband and Wife as a proportion of the total number of obligatory prayers depending on whether Muslim (35 per week) or Hindu (21 per week) is also adopted as an indicator of religiosity, and is measured in terms of prayers per week rather than prayers per day. This is because the second prayer of the day on Friday for Muslims is congregatory and holds special religious significance (Quran verse 62:9). Because in the context under investigation this congregatory prayer is interpreted as a male-specific activity, some Muslim men might perform only this one prayer in the week and this prayer would evade data capture if prayers were measured in terms of typical daily performance. Religiosity in health seeking behaviour in relation to the ill health of children by both Husband and Wife is an indicator aimed at capturing even the slightest religious inclination which may express itself under such relatively stressful circumstances and is important as a demonstrator of the belief in God's provision of care for children. Lastly, whether ordained economic provisioning for children is a belief that is subscribed to by the Husband and Wife aims directly at that aspect of religious belief relevant to the process of calculation with regards to the economics of fertility.

Case Selection Notes

Case selection incorporated two indicators from Condition 2: Religiosity. For Muslim couples the sole indicator of dress code for women was used as selection criterion on the basis that this is a relatively concrete and observable indicator. For Hindu couples selection proceeded on the basis of the sole indicator of the number of prayers performed per week by the Husband, for the pragmatic reason that men were more accessible during the respondent qualifying process during which couples were selected for interview.

Concept Logical Engineering Notes

The logical engineering process was unable to provide a meaningful post-examination operationalisation for Condition 2: Religiosity. Case selection proceeded with two indicators of Religiosity, Wife's Purdah for Muslim couples and Husband's Religious Adherence for Hindu couples. Condition 2: Religiosity in its pre-examination operationalisation incorporated a range of different indicators providing a theoretical basis for the combination of Condition 2: Religiosity with Condition 3: Wealth Flow Motivations as per model specification. However most of these indicators emerged redundant because of the lack of variation in the values across all the cases. These same indicators provided the theoretical explanation and basis for why Condition 2: Religiosity should be combined with Condition 3: Wealth Flows Motivations. The only indicator in Condition 2: Religiosity which exhibits any variation across the cases, other than the two indicators the couples were selected on, is Wife's Religious Adherence. Taken together, or individually, or in any combination with one another, these three indicators are unable to yield a theoretically meaningful basis for the combination of Condition 2: Religiosity with Condition 3: Wealth Flows Motivations. As such the logical engineering of Condition 2: Religiosity in a theoretically meaningful manner, which is the key principle of the process, was not possible.

5.1.3 - Conceptualisation and Operationalisation of Mechanism Condition 3: Wealth Flow Motivations

This section examines theory and concepts, operationalisation and the logical engineering for Mechanism Condition 3: Wealth Flow Motivations. The possible relationship between Wealth Flows and fertility is discussed first.

Wealth Flows and Fertility

For Caldwell (1976:344) the fundamental issue in demographic transition is the direction and magnitude of intergenerational wealth flows, or the net balance of the two flows, that is, downward flows from parents to children and upward flows from children to parents, spanning the period between when people become parents until they die.

In pre-transitional high-fertility societies the net wealth flow is upward from children to parents (Caldwell 1976:344). The post-transitional low-fertility society is one in which the net wealth flow is downward from parents to children (Caldwell 1976:344). The divide occurs in the transitional society where the net wealth flow hesitatingly swings from net upward to net downward wealth flows (Caldwell 1976:345). High fertility remains rational in urban conditions provided wealth flows are predominantly upward from children to parents (Caldwell 1976:348).

Pre-examination Operationalisation of Mechanism Condition 3: Wealth Flow Motivations

Caldwell (1976) views political power, economic advantage and family size in the pre-transitional family not only as inter-related, but argues that in some contexts, such as that of rural Yoruba society, they are so intrinsically inter-related that people view them as “one and the same thing” (Caldwell 1976:341). In the examination of wealth flow motivations it is therefore appropriate and useful to classify wealth flows into two distinct types: the political and the economic, and both must be taken in the pre-examination operationalisation to constitute Condition 3: Wealth Flow Motivations.

Political wealth flows

Networks of relatives in the pre-transitional society are important for security, cooperation in less serious situations, as allies in political contest and for the magnification of one's social importance (Caldwell 1976:341). According to the wealth flows theory there are only two means through which the size of one's network of relatives can be increased: reproduction, that is through increasing the size of one's own family unit, and through the marriage of one's children (Caldwell 1976:340-1).

In pre-transitional societies, patriarchal males in particular benefit from situational gains (Caldwell 1976:343). Much of the wealth flow is not direct but derived through the extra political power exerted by men with many children, particularly adult sons and daughters married into other families (Caldwell 1976:346).

Pre-examination operationalisation of political wealth flows

Given that theoretically a large family and network of relatives is the route to enhanced security, cooperation with others, political power and social importance, and that the marriage of one's children is one of only two routes through which patriarchs can increase the size of their network of relatives (see Caldwell 1976:340-1), pre-transitional patriarchs should have a strong and well specified preference to marry both their sons and daughters into large families, whom by virtue of their family size will, according to theory, yield more political power and thus represent a more attractive alliance when compared to smaller families. An indicator based on questions eliciting a response from the Husband (the possible patriarch) relating to the ideal number of brother in-laws and sister in-laws for his own sons and daughters aims to capture such in-law derived political wealth flow motivations.

Given however that Caldwell (1976:344-5) also argues that in pre-transitional societies there is a tendency for parents to over-state their contributions to children and under-state contributions or benefits derived from their children, ancillary questions which ask for reasons for the responses provides clarification and allows for further theoretical scrutiny, even though these reasons as captured cannot themselves be accommodated in the logical engineering process if we are to seriously take into

consideration Caldwell's (1976:334-5) reservations with regards to parental accuracy about upward wealth flows.

Economic wealth flows

Caldwell (1976:343-4) specifies a range of different economic advantages that accrue to pre-transitional parents, noting that patriarchal males in particular benefit from situational gains due to inequalities in the distribution of wealth or consumption within the family based on age, sex and family status: as the number of children beyond infancy, wives and son in-laws and daughter in-laws expands, those at the top of the pyramid control more resources and access more services; children work in the household or farm producing goods and providing a range of services such as carrying fuel and water, looking after younger siblings, cleaning and the like; adult children usually assist their parents through the provision of labour inputs and gifts; adult children assist with family contributions to community festivities and family ceremonies such as marriages and funerals; parents are cared for in their old age; parents can invest in the education of children with the expectation of higher returns, although the motive is only partly economic.

Pre-examination operationalisation of economic wealth flows:

Given Caldwell's (1976:344-5) reservations with regards to the ability of the researcher to elicit accurate responses from parents with regards to wealth flows due to the alleged tendency of parents to over-state their contributions to children and under-state the return flows from children, indicators for motivations relating to economic flows in particular would appear to be best operationalised with regards to strong implications of the patriarch's expected economic wealth flows, but formulated as subtle questions. Parental altruism towards offspring should be very limited and over-ridden by strong considerations of economic wealth flows in the pre-transitional high-fertility family, in stark contrast to the post-transitional low-fertility family characterised by an abundance of parental altruism towards offspring (see Caldwell 1976:352).

This tension between upward economic wealth flows from offspring and altruism towards offspring (and also grandchildren – see Caldwell 1976:352) can manifest itself in various ways, for example in expectations held (and therefore acceptance) by the Husband (the possible patriarch) as to whether income flows from adult sons, if these are expected at all, will decline after sons are married and have wives and children of their own to support.

Since theoretically it is the older generation, particularly patriarchs, that yield decision making power with regards to the marriage of offspring (see Caldwell 1978:557), it is also reasonable to expect that wealth flow motivations will be captured through questions which relate to the Husband's preferences regarding the particular form of marriage for offspring, on the pre-fieldwork presumption that the form of marriage might impact the risk of son 'default' whereby upwards wealth flows might cease or be substantially reduced, and might impact the well-being of daughters after marriage and so impinge on any altruistic parental concerns for them. Due to pre-fieldwork uncertainty as to the possible implications that particular forms of marriage might have with regards to the risk of son default or the well-being of daughters in the context under examination, ancillary questions eliciting the reasons for the preferred form of marriage were incorporated to allow informed coding for the Husband's preferred form of marriage for sons and daughters, bearing in mind that the reasons provided by respondents cannot themselves be incorporated into the logical engineering process due to Caldwell's (1976:334-5) disclaimer with regards to parental accuracy about upward wealth flows.[76]

Concept Logical Engineering Notes

The logical engineering process produced a post-examination operationalisation for Condition 3: Wealth Flow Motivations based on entirely on the component Political Wealth Flows which in turn is determined by in-law-derived wealth flows through the marriage of both sons and daughters.

[76] Forms of marriage are discussed in further detail in the section on the pre-examination operationalisation of Condition: 2 Divorce Threat in Model 3: Bargaining and Social Norms.

5.1.4 - Conceptualisation and Operationalisation of Mechanism Condition 4/Outcome 1H: Husband's Fertility Demand

This section examines theory and concepts, operationalisation and the logical engineering for Mechanism Condition 4/Outcome 1H: Husband's Fertility Demand.

Husband's Fertility Demand

Caldwell (1978:555) argues that in familial modes of production, different members of the family enjoy different advantages based on their positioning within the family structure, and that intergenerational flows are of utmost importance when assessing the utility of fertility. Therefore, reproductive decisions are not really separable from economic decisions because the reproductive pattern is required to support the economic one, including the maintenance of gradations of material advantage within the family (Caldwell 1978:566). Given that the patriarch has control of the economic system within the family, he also exercises control over reproduction, albeit in a less direct and potentially less certain manner (Caldwell 1978:566). For the wealth flows theory therefore it is the Fertility Demand of the Husband, as the possible patriarch, which is of relevance.

Pre-Examination Operationalisation of Mechanism Condition 4/Outcome 1H: Husband's Fertility Demand

Within the context of the wealth flows theory, the Husband should have well defined fertility preferences from the very start of marriage. Specifically, having grown up in the high-fertility extended family network, and thus clearly aware of the wealth flow advantages of high fertility (see Caldwell 1976:348-9), the pre-transitional Husband should have strong preferences for high fertility generally, and strong and obvious son preference (see Caldwell 1978:556). This is because although theoretically there are upward wealth flows that are enjoyed from both sons and daughters before their marriage (see Caldwell 1976, 1978), and political advantages to be gained through the marriage of both sons and daughters, in the context of Bangladesh sons remain members of the patriarch's family upon their marriage and ensure the survival of the

family lineage (see Caldwell 1976:343), and therefore upward wealth flows in various forms from sons would be expected to span the entire life-time of the patriarch (see Caldwell 1978:553) whereas daughters marry into another family (see Caldwell 1978:556), and therefore the upward wealth flows from daughters post-marriage are limited to the political wealth flows arising from the alliance established with another family through marriage.

Sons therefore offer the greatest potential for upward wealth flows from the perspective of the pre-transitional patriarch. Operationalisation therefore incorporates the Husband's fertility demand for sons and daughters at the start of marriage, preference for a son or daughter before the birth of each child, the final fertility demanded, unwanted fertility to establish the difference between the actual fertility outcome and whether there was a desired ceiling which was over-shot, unrealised fertility incidences (miscarriages and stillbirths) which, for the pre-transitional patriarch should have little or no impact in the adjustment of his fertility demand in view of the health risks to the Wife whose work is undervalued anyway (see Caldwell 1978:556), the mortality of live-born children which may have the impact of increasing demand for the number of children born in order to attain a certain target of living children through 'replacement' children in order to maintain upward wealth flows (see Caldwell 1976:345), and child permanent injury which may also have the same impact on fertility demand if the nature of the injury is such that it would affect potential upward wealth flows.

In contrast, the post-transitional Husband could be expected to have a low fertility demand at the start of marriage due to a lack of wealth flow incentives (see Caldwell 1976:352), no son preference even though there may be a preference to have a mixture of sons and daughters, low final fertility demanded, more concern with the health risks to the Wife arising from unrealised fertility incidences due to the strong conjugal emotional bond (see Caldwell 1976:354) and less inclination to 'replace' dead or permanently injured children through higher fertility due to the over-riding importance of parent-child emotions (see Caldwell 1976:340) and the insignificance of upward wealth flows as an incentive (see Caldwell 1976:352).

Concept Logical Engineering Notes

The logical engineering process produced the post-examination operationalisation of Condition 4/ Outcome 1H: Husband's Fertility Demand based on son/daughter preference if this is present, and if it is not present then on the fertility demand at the start of marriage. In other words if there is no son/daughter preference, then fertility demand remains static, whereas if there such preferences are held, fertility demand becomes dynamic and adjusts upwards.

5.1.5 - Model Level Summary

The table presents the logical engineering results for all the conditions of each case in relation to Model 1: Wealth Flows.

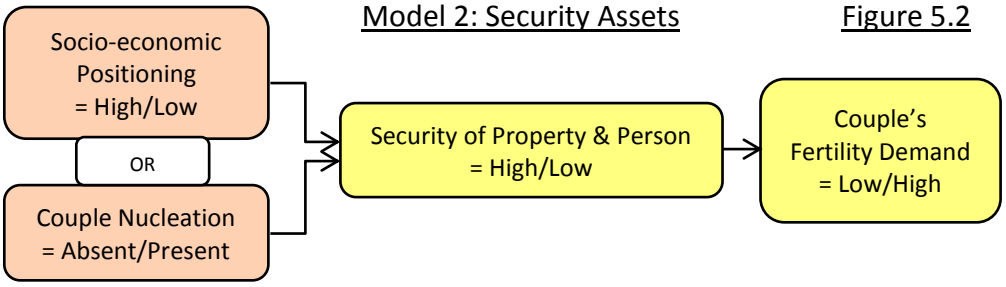
Table 5.1 **Model 1: Wealth Flows, Logical Engineering Results**

Conditions:	**Case ID:**							
	44	**28**	**33**	**60**	**22**	**12**	**50**	**8**
Condition 1: Couple Nucleation Present(1) Partial(--) Absent(0)	0	1	--	--	--	0	--	1
Condition 3: Wealth Flow Motivations Low(1) Indeterminate(--) High(0)	0	1	--	--	0	--	1	1
Condition 4/Outcome 1H: Husband's Fertility Demand Low(1) Medium(--) High(0)	0	1	0	1	1	1	0	1

5.2 - Model 2: Security Assets

The conceptualisation and operationalisation of Model 2: Security Assets is now presented, starting with a diagrammatic representation of the model and the specification of hypotheses. Next, in separate sections for each condition, the conceptualisation and operationalisation of each condition is discussed in detail, with case selection notes when relevant to the condition, and logical engineering notes. Finally, a summary of the logical engineering results for the model presents all the values assigned to each condition of each case in tabular format.

Model 2: Security Assets Figure 5.2



Hypotheses

Positive Instances:

1) Socio-economic Positioning = High(1) OR Couple Nucleation = Absent(1)
   tends to produce
   Security of Property & Person = High(1)

2) Security of Property & Person = High(1)
   tends to produce
   Couple's Fertility Demand = Low(1)

Negative Instances:

1) Socio-economic Positioning = Low(0) OR Couple Nucleation = Present(0)
   tends to produce
   Security of Property & Person = Low(0)

2) Security of Property & Person = Low(0)
   tends to produce
   Couple's Fertility Demand = High(0)

5.2.1 - Conceptualisation and Operationalisation of Exogenous Condition 1: Socio-economic Positioning

This section examines theory and concepts, operationalisation and the logical engineering for Exogenous Condition 1: Socio-economic Positioning. The possible relationship between Socio-economic Positioning and security is discussed first.

Socio-economic Positioning and Security

Cain (1982:167) with regards to the general context of the developing world views political and administrative development as associated with different levels of lawlessness and threats to property, with development providing a type of 'insurance' against insecurity through the police, courts and the law. In the context of rural Bangladesh, Cain (1981:460) notes the high risk of land expropriation with little or no recourse since personal attempts at repossession might be met with violence, police enforcement is subject to bribery, and the courts are similarly compromised to the extent that litigants face the prospect of engaging with a judicial system in which “the most likely winner would be he who proffered the largest bribe” (Cain 1981:460). The risk of land expropriation is especially high in situations in which the patriarch passes away without a surviving mature son, able to support his widowed mother and other dependents and of effectively defending the inheritance (Cain 1978:427).

In low developmental patriarchal settings, sons in particular offer a type of insurance against insecurity, ultimately through the threat of violence they pose as a deterrent against physical and property insecurity, as relatively able intermediaries between women within the family unit and the wider male dominated society they live in, and additionally against health risks posed to the whole family in their likely ability to demand more serious attention in interactions with the health system as well as in their ability to assign care duties for the elderly to other women in the family, for example by insisting a wife provides care for parents. However, given that higher levels of physical, property and health security through the public sector are all likely to be subject to 'purchase' through bribery, sons and socioeconomic positioning can be viewed as substitutes to one another.

Pre-Examination Operationalisation of Exogenous Condition 1: Socio-economic Positioning

Since Cain's (1983) Security Assets theory relates to a patriarchal society, Socio-economic Positioning incorporates only the Husband's quantity of education and 'quality' of education aiming to capture aspects of social and economic positioning of the family unit, with 'quality' of education ordinally ranked not on the basis of any objective assessment of educational quality but rather on what is understood to be the general perception in Chittagong with regards to the differences in social and economic rank of the recipients by type of institution attended (e.g. madrassah, Bengali medium institution, English medium institution).

Husband's quantity and quality of education by themselves however might not be adequate as indicators in capturing ability to proffer bribes due to the expected weak linkage between the value of these indicators (which are also expected to vary within an extremely narrow range for the respondents) and the economic means at the disposal of the family for the purposes of bribery. Therefore, permanent income indicated by the absolute number of rooms used by the family for sleeping is also incorporated as an indicator of Socio-economic Positioning and carries with it the advantage of potentially capturing all income received by the family including any generated by the Wife. This indicator is similar to the indicator 'dwelling size' that is commonly used as a measure of socioeconomic status of the family unit (see Balk 1994:28). Although Condition 1: Socio-economic Positioning is exogenous, it is a floating condition subject to post-examination concept logical engineering and therefore case selection is not based on any of it indicators.

Concept Logical Engineering Notes

The indicator Quality of Education could not be coded meaningfully because the data for respondents was either inapplicable (due to no schooling) or the same for all respondents when it was applicable (Bengali medium institution). Accordingly the logical engineering process operationalises Condition 1: Socio-economic Positioning as being constituted by the combination of the indicators Quantity of Education and Permanent Income.

5.2.2 - Conceptualisation and Operationalisation of Exogenous Condition 2: Couple Nucleation

This section examines theory and concepts, operationalisation, case selection and the logical engineering for Exogenous Condition 2: Couple Nucleation. The possible relationship between Couple Nucleation and security is discussed first.

Couple Nucleation and Security

As in Model 1: Wealth Flows, the period of relevance to fertility decision making is the childbearing phase.

In contrast to Caldwell (1976, 1978, 1982) who associates strong relations between members of the extended family with high fertility, Cain (1983:697) argues that in contexts of high insecurity such as that of Bangladesh, weaker bonds of obligation and cooperation amongst lateral kin will have the effect of shifting reliance for security towards lineal kin, that is offspring (see also Cain 1982:160). Cain (1983:697) argues that under these circumstances if the security of property rights is dependent on strength in numbers or there are culturally determined limitations on the economic activities of women, the number of sons demanded will increase. Cain (1981:462) also argues that unlike the extended family, parents usually have a clearer claim upon the resources of offspring when compared to their extended family, and rejects the idea that the extended family can be expected to provide mutual guarantees against economic disaster (see Cain 1982:171-3). Couple nucleation is therefore expected to result in both the Husband's and Wife's demand for high fertility, particularly sons, and its absence is expected to result in the Husband's and Wife's demand for low fertility.

Operationalisation of Exogenous Condition 2: Couple Nucleation

Cain (1982, 1983) refers to strong “lateral bonds of obligation and cooperation” (Cain 1983:697) and “mutual obligation and support” (Cain 1982:160) amongst extended family networks, and his understanding of extended family relations is in essence therefore the same as Caldwell's (1976, 1978) understanding of the nature of the relations across the high fertility pre-transitional extended family. The implications of

these extended family relations for the fertility of the couple are however viewed differently. Cain (1982, 1983) emphasises security incentives of the couple as the key driver for high fertility in the presence of weak extended family bonds, whilst Caldwell's (1976, 1978) emphasis is on the wealth flow incentives of senior patriarchs as the key driver for high fertility in the presence of strong extended family bonds. Whilst the causal implications of extended family relations for fertility, and therefore of the condition Couple Nucleation, are viewed as opposite to each other, the relevancy of the concept of Couple Nucleation itself is valid for both theories. As such, Condition 2: Couple Nucleation in this model is operationalised identically to Condition 1: Couple Nucleation in Model 1: Wealth Flows.

Case Selection Notes

Because the operationalisation of the condition Couple Nucleation is identical in this model that in Model 1: Wealth Flows, case selection proceeded with a mixture of associations between different values of Couple Nucleation and the Fertility Outcome. See Case Selection Notes for Condition 1: Couple Nucleation in Model 1: Wealth Flows for further details.

Concept Logical Engineering Notes

Logical engineering proceeded as per the operationalisation detailed in the relevant section above.

5.2.3 - Conceptualisation and Operationalisation of Mechanism Condition 3: Security of Property and Person

This section examines theory and concepts, operationalisation and the logical engineering for Mechanism Condition 3: Security of Property and Person. There are three conceptual components for this condition: a) security of person b) security of property and c) security of health. After the logical engineering results for Condition 3 are presented, these three components are discussed separately.

Security of Property and Person as a Shared Interest of the Couple

Cain (1982:168) acknowledges the significance of intra-family member conflicts of interest and inequality as focused on by Caldwell (1976, 1978) but argues that even in the presence of hierarchical family structures, family members continue to share many interests and concerns, and systems of male dominance are not necessarily inconsistent with shared interests. If the production system depends on a large number of children and for example the patriarch falls ill resulting in the distressed sale of land for want of a mature son, all members of the family suffer not just the patriarch (Cain 1982:168). Over emphasis on the internal dynamics of the family and the situational advantage of the patriarch carries with it the risk of underestimating the importance of exogenous factors which affect the whole family (Cain 1982:168). Cain (1982:168-9) therefore emphasises the shared security interests of the couple and even goes as far as pointing out that in situations where there is the extreme economic dependency of women on men, women might actually want higher fertility than men. It is therefore essential that Condition 3: Security of Property and Person incorporates indicators that are relevant to the security of both the Husband and Wife, and which are based on both their perceptions and experiences.

Condition 3: Security of Property and Person encapsulates three conceptual components considered of critical importance: a) security of person b) security of property and c) security of health, each of which is discussed separately in the sections below and relate to the childbearing phase as the period of relevance to the couple's fertility decision making. The end result of the operationalisation of Condition 3: Security of Property and Person however is presented immediately below.

Concept Logical Engineering Notes

The logical engineering process produced near-perfect compliance across the cases for theoretically consistent values of Condition 3: Security of Property and Person with the values of Dependent Outcome: Fertility Outcome in Model 4: Family Planning, through the post-examination operationalisation of Security of Property and Person based plausibly and parsimoniously on the sole component c) Security of Health.

The details of each component ar provided below.

Conceptualisation and Operationalisation of Component a) Security of Person

The period of relevance to fertility decision making is the childbearing phase.

Cain (1982) argues that "Political and administrative development typically reduces physical insecurity by providing the 'insurance' of police, courts, and law" (Cain 1982:167). In low development settings such as that of Bangladesh however, where the state is unable to provide sufficient levels of physical security, "a man can usually count on the support of brothers and other kin against political and physical threats" (Cain 1982:174). In the absence of strong lateral family ties, security becomes dependent on lineal family relationships, specifically sons, which results in high fertility demand (Cain 1982:160, 1983:697).

In essence Cain (1982, 1983) views the physical protection of the person by the legal system including the police and courts, by the extended family, and by sons as substitutes to each other. They might however also serve as compliments to one another in the sense that in environments perceived as being characterised by low levels of physical security with exposure to a high level of risk, the conjugal couple become more dependent in the mitigation of these risks on the police and law enforcement administration and/or the extended family, and/or on sons, whilst perceptions of an environment characterised by relatively high levels of physical security with a perceived low level of exposure to risk create lower levels of reliance on all of these sources of mitigation.

Pre-Examination Operationalisation of Component a) Security of Person

Bearing in mind that the emphasis in this model is upon the security risks that relate to the conjugal couple as a unit, the component Security of Person incorporates indicators scoped to the couple's childbearing phase that relate to: the perceived environmental exposure of the couple to security risks; the personal experiences of the Husband and Wife in terms of suffering physical attacks (which are expected to influence their perception of general environmental exposure to security risks); the couple's confidence in the willingness and ability of the police to provide protection against physical attack with reasons for responses; the couple's confidence in the willingness and ability of extended family to provide protection against physical attack with reasons for the responses, supplemented with the inclusion of an additional indicator for willingness of extended family in the form of childcare by extended relatives with the aim of capturing the level of trust held by the conjugal couple in their extended family; and with an additional indicator for ability of extended family in the form of the number of adult male relatives within easy travelling distance from the couple's home during the relevant period.

Concept Logical Engineering Notes of Component a) Security of Person

The logical engineering process produced a post-examination operationalisation for the conceptual component a) Security of Person for those couples with a low perceived exposure to security risk as requiring at least a medium level of overall confidence (willingness and ability) in either the police *or* extended family in the provision of security to result in a high level of perceived overall Security of Person for them. Also, regardless of the level of perceived exposure to security risk, mitigation in the form of a high level of overall confidence in both the police *and* extended family in the provision of security to the couple also results in a high level of Security of Person. Otherwise, regardless of the perceived exposure to security risk, subject to the couple not exhibiting any of the above mitigations, Security of Person is low.

Conceptualisation and Operationalisation of Component b) Security of Property

The period of relevance to fertility decision making is the childbearing phase.

Cain (1983:694-5) in reference to rural South Asia notes the direct threat to the security of land assets in the form of physical expropriation and the fraudulent manipulation of land records and titles (see also Cain 1981:453). In rural Bangladesh in particular, the ineffectualness of formal institutions such as the police and courts which would normally be expected to resolve disputes and enforce rulings results in the risk of land disputes spanning across generations with resolution usually turning on the balance of power between the disputants (Cain 1978:427-8). Cain (1981) therefore argues that barring the 'insurance' of just adjudication and law enforcement, the potential importance of sons for the protection of property rights “seems clear” (Cain 1981:462), and this role of offspring in the prevention of property loss in the absence of other alternatives provides for powerful disincentives against the adoption of contraception to limit fertility (Cain 1981:467) for both husband and wife (see Cain 1978:427; Cain 1982:160). Since the security of land and the income to be derived from it is at risk in many third world settings, offspring should be viewed as security compliments to land rather than as substitutes (Cain 1983:695). In Bangladesh, mature sons serve the function therefore as a deterrence against the depredation of property rights (Cain 1986:300). Cain (1986:299) argues that because formal property rights are weak throughout rural Bangladesh, the appropriate level of analysis is not the individual, household, village or district but rather the whole of society, because it is only at this level of analysis that we might find meaningful variations in the sources and severity of risk and avenues of insurance against them.

Given however that in any particular setting there will be couples with varying fertility outcomes, varying perceptions of the exposure, and of the efficacy of deterrents and responses, to threats to property rights might account for such varying fertility outcomes.

Pre-Examination Operationalisation of Component b) Security of Property

Security of property incorporates indicators that relate to perceptions held by the Husband and Wife during the childbearing phase with regards to the general security of property rights with specific focus on the risks of expropriation of residential property; the couple's own personal experiences of such expropriation which might influence their perceptions of the general risks; their perceptions with regards to norms of adopting violence as the usual means to assert property rights (which would theoretically have an impact on the appeal of having many sons); the source of assistance and the means through which the assertion of the couple's own personal property rights would occur (again with a focus upon violence); the perceived efficacy of these means which demonstrates the couple's perception of security with regards to their own personal property rights; and the couple's experiences of infringements of their own personal property rights through theft which might influence their perceptions with regards to their own and the general security of property rights.

Concept Logical Engineering Notes of Component b) Security of Property

Logical engineering produced a post-examination operationalisation for the conceptual Component b) Security of Property based on perceptions of security of property rights and violent norms in combination with one another.

Conceptualisation and Operationalisation of Component c) Security of Health

Cain (1978:424) notes in the context of rural Bangladesh the highly uncertain reproductive future of the couple, with important sources of uncertainty including the incidence of infant and child mortality. Drawing on lexicographic decision rules based on 'safety-first' criterion in contrast to neoclassical models which assume decisions based on utility maximisation, Cain (1983:697) suggests that couples may define the minimum fertility target required for old age security, for example one healthy and loyal surviving son, but this target may be operationally revised upwards in the context of the high risk of child mortality or son default. At the same time, Cain (1983:699) in reference to contexts such as that of Bangladesh, argues that a decline in mortality risk

may not result in fertility declines if the security target is sufficiently high and it is only when the security target itself is also revised downwards due to favourable changes in the environment of risk and alternative sources of insurance that fertility responses occur.

Cain (1978, 1981, 1983) additionally notes the importance of health in terms of the risk of debilitating illness suffered by the patriarch (Cain 1978:431), the risk to sons in their capability to perform as security assets (Cain 1978:431, 1983:697), as a factor that can lead to the distressed sale of land (Cain 1981:451), and in terms of the unique and largely irreplaceable role that offspring can play in the provision of care for parents in ill-health (Cain 1983:695). It is important therefore to incorporate the perceived and actual exposure to the (in)security of health over the childbearing phase as an essential aspect of Condition 3: Security of Property and Person.

It may be noted that Cain's (1978, 1983) understanding of the influence of the risk of infant and child mortality on fertility preferences aligns with that of the classical theory of demographic transition (see Notestein 1945) but the posited motivations underlying the link differ. Whilst for Notestein (1945, 1983) high fertility in response to high mortality risks is driven through the irrational adherence to norms, traditions, beliefs and customs which favour high fertility thus ensuring the ongoing continuance of the group, for Cain (1978, 1983) high fertility preferences arise from the rationally calculated response by the couple to high infant and child mortality risks with a view, driven by security motivations, to achieving target fertility outcomes in terms of the living number of children, particularly sons. In contrast both theories posit that low fertility preferences arise from rational calculation. For the classical theory of demographic transition it is the growing awareness that mortality risks are reduced amongst couples that develops their Readiness to limit fertility although their Willingness to do so follows after a period of lag (see Notestein 1983:350).

As such, Security of Health as a component of Mechanism Condition 3: Security of Property and Person in Model 2: Security Assets can be considered as partially relating to the classical theory of demographic transition. Whilst the couple's perception of high mortality risks is theoretically irrelevant in the classical theory, because rational fertility decision making in high mortality pre-transitional circumstances is theoretically

absent, the couple's perception of low mortality risks is relevant, at least in terms of their formulation of the Readiness to limit fertility.

Pre-Examination Operationalisation of Component c) Security of Health

The indicators that constitute the component Security of Health effectively extend the scope of the risks beyond the immediate risk of infant and child mortality emphasised by Cain (1978, 1983) in the couple's setting of security-driven fertility targets. Exposure to the more general environment of risk in relation to maternal mortality, stillbirth, neonatal mortality, norms of access to higher quality healthcare indicated by the quality of maternal healthcare, environmental exposure to child mortality related risks and child permanent-injury risks, and norms of access to higher quality healthcare indicated by the type of medicinal remedies used for the treatment of children are expected to shape the overall perceptions held by the couple with regards to the risk that their own children may fail to fulfil their security function, either due to mortality, permanent injury or severely compromised health.

Quality of maternal healthcare norms is taken to indicate the perceived quality of healthcare generally accessible to the couple and their children through the health system, and is viewed as a suitable indicator in this regard because birthing is a frequent and usually a standard healthcare issue, the norms of which are expected to be more clearly perceived by the respondents. A high quality of maternal healthcare indicating a high quality of general healthcare available to all members of the family should theoretically lower incentives for high fertility. It may be noted however that the Wife's access to a low quality of maternal healthcare could also potentially lower incentives held by the Husband and/or Wife for high fertility due to perceived higher risks of maternal mortality. This would be consistent with Cain's (1982:168-9) emphasis on the shared interests of the couple. However, unrealised fertility incidences personally experienced by the couple, that is, the frequency of miscarriages or stillbirths, contained in the operationalisation of both Condition 4/Outcome 1H: Husband's Fertility Demand in Model 1: Wealth Flows and Condition 6/Outcome 1W: Wife's Fertility Demand in Model 3: Bargaining and Social Norms already addresses the possibility of the downward revision of fertility targets in view of the risks to maternal

health as well as aiming to capture the possible emotionally driven implications of these events for fertility target adjustment. Accordingly, quality of maternal healthcare norms is incorporated as an aspect of component c) Security of Health.

Concept Logical Engineering Notes of Component c) Security of Health

Logical engineering produced a plausible and parsimonious post-examination operationalisation for the conceptual component c) Security of Health based entirely on the indicator Quality of Maternal Healthcare Norms.

5.2.4 - Conceptualisation and Operationalisation of Mechanism Condition 4/Outcome 1C: Couple's Fertility Demand

This section examines theory and concepts, operationalisation and the logical engineering for Mechanism Condition 4/Outcome 1C: Couple's Fertility Demand.

Couple's Fertility Demand

Whilst Cain (1982:160, 169) is in agreement with the thesis of the wealth flows theory that gender stratification may lead to high fertility, he rejects the argument that the disproportionate material advantages that men enjoy from having large families is the key cause of the perpetuation of high fertility. Cain (1982:169) instead suggests that the major causal significance of gender stratification for fertility lies in the excessive risk it produces for women through their economic dependence on men created through the gendered division of labour, restrictions on their physical mobility and labour market segmentation. Under such circumstances there are special risks for women that arise from the threatening events of widowhood, divorce, separation or the incapacitating illness of the husband, and as a consequence it is women for whom the incentives for high fertility are greatest (Cain 1981:453, 1982:169, 1983:697).

Cain (1978) notes that in the context of rural Bangladesh there is a “very high probability of widowhood” (Cain 1978:431) due the typically large difference in age at marriage for males and females, and argues that because of this “wives constitute a special interest group with respect to the production of sons” (Cain 1978:432), but avoids specifying the wife's fertility demand as the main driver of fertility outcomes. Instead, Cain (1982:169) argues that the wealth flows theory over-emphasises the importance of intra-familial gender inequalities and overlooks the importance of the impact on the common interests of the family, and therefore on reproductive strategies, of factors that are external to the family unit. For Cain (1982:168) therefore, even with hierarchical family structures, there are many commonly shared interests amongst members of the same family because circumstances that adversely affect the patriarch's interests will most likely also have an adverse impact on the family unit as a whole and therefore all its members, for example the distressed sale of land for want of a mature son if the patriarch falls ill. Accordingly it is appropriate for this model to

combine the Husband's Fertility Demand with the Wife's Fertility Demand to produce Condition 4/Outcome 1C: Couple's Fertility Demand.

Pre-Examination Operationalisation of Mechanism Condition 4/Outcome 1C: Couple's Fertility Demand

There are several points to note in relation to Cain's (1978, 1981, 1982, 1983) views on the formulation of fertility preferences, which are virtually identical in implication for the operationalisation of Condition 4/Outcome 1C: Couple's Fertility Demand when compared to the operationalisation of Condition 4/Outcome 1H: Husband's Fertility Demand in Model 1: Wealth Flows and Condition 6/Outcome 1W: Wife's Fertility Demand in Model 3: Bargaining and Social Norms, with the obvious difference that in this model both Husband's Fertility Demand and Wife's Fertility Demand are combined and the underlying incentives driving fertility preferences here relate to security concerns.

Fertility preferences for both Husband and Wife at the start of marriage should be well specified and clearly apparent to them in response to the security risks to person, property and health (see Cain 1978:430, 1981:436, 1982:167, 1983:691). With a clear awareness of the security advantages of high fertility, couples with a low value for Condition 3: Security of Property and Person should have strong preferences for high fertility generally, and strong and obvious son preference, since it is adult sons rather than adult daughters who will mitigate security risks (see Cain 1978:430-1, 1981:458, 1982:167-70, 1983:696-7). The operationalisation of Condition 4/Outcome 1C: Couple's Fertility Demand therefore incorporates the Husband's and Wife's fertility demand for sons and daughters at the start of marriage, preference for a son or daughter before the birth of each child, the final fertility demanded, unwanted fertility to establish the difference between the actual fertility outcome and whether there was a desired ceiling which was over-shot, unrealised fertility incidences (miscarriages and stillbirths) which, for couples with a low value for Condition 3: Security of Property and Person should have little or no impact in the adjustment of their fertility demand in view of the health risks to the Wife due to the over-riding importance of fertility targets based on more 'certain' long term security concerns, the mortality of live-born

children which may have the impact of increasing demand for the number of children born in order to remain on course for the attainment of security-driven fertility targets if the risk of child mortality has not already been implicitly factored into initial fertility preference formulation at the start of marriage (see Cain 1982:164), and child permanent injury which may also have the same impact on the Husband's and Wife's fertility demand if the nature of the injury is such that it would affect the potential security 'capability' of the offspring in adulthood (see Cain 1978:431).

In contrast, couples with a high value for Condition 3: Security of Property and Person are expected to have a low fertility demand at the start of marriage because the security function of children will be of little relevance to them, no son preference even though there may be a preference to have a mixture of sexes, low final fertility demanded, more concern with the health risks to the Wife arising from unrealised fertility incidences due to the strong shared interests as a family unit (see Cain 1982:168-9) with the possibility of contraception being viewed as a means to preserve the health of the Wife (see Cain 1978:431), and less inclination to 'replace' dead or permanently injured children through higher fertility because there is little or no security related incentive to do so.

Concept Logical Engineering Notes

Logical engineering proceeded with the post-examination operationalisation of Condition 4/Outcome 1C: Couple's Fertility Demand by combining Condition 4/Outcome 1H: Husband's Fertility Demand from Model 1: Wealth Flows and Condition 6/Outcome 1W: Wife's Fertility Demand from Model 3: Bargaining and Social Norms.

5.2.5 - Model Level Summary

The table presents the logical engineering results for all the conditions of each case in relation to Model 2: Security Assets.

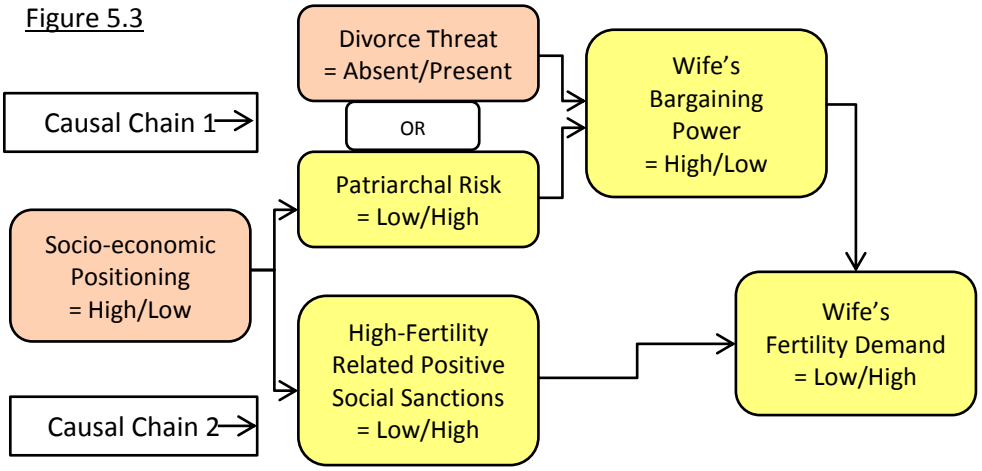
Table 5.2	**Model 2: Security Assets, Logical Engineering Results**							
Conditions:	**Case ID:**							
	44	**28**	**33**	**60**	**22**	**12**	**50**	**8**
Condition 1: Socio-economic Positioning High(1) Medium(--) Low(0)	--	1	0	--	--	0	1	--
Condition 2: Couple Nucleation Absent(1) Partial(--) Present(0)	1	0	--	--	--	1	--	0
Condition 3: Security of Property and Person High(1) Low(0)	0	1	0	1	0	0	0	1
Condition 4/Outcome 1C: Couple's Fertility Demand Low(1) Medium(--) High(0)	0	1	--	1	--	1	--	1

5.3 - Model 3: Bargaining and Social Norms

The conceptualisation and operationalisation of Model 3: Bargaining and Social Norms is now presented, starting with a diagrammatic representation of the model and the specification of hypotheses. After this, because the model contains two distinct causal chains, an overview of theories relevant to the model is provided. Next, in separate sections for each condition, the conceptualisation and operationalisation of each condition is discussed in detail, with case selection notes when relevant to the condition, and logical engineering notes. Finally, a summary of the logical engineering results for the model presents all the values assigned to each condition of each case in tabular format.

Model 3: Bargaining and Social Norms

Figure 5.3



Hypotheses: Causal Chain 1

Positive Instances:

1) Socio-economic Positioning = High(1)

   tends to produce

   Patriarchal Risk = Low(1)

2) Patriarchal Risk = Low(1) OR Divorce Threat = Absent(1)

   tends to produce

   Wife's Bargaining Power = High(1)

3) Wife's Bargaining Power = High(1)

   tends to produce

   Wife's Fertility Demand = Low(1)

Negative Instances:

1) Socio-economic Positioning = Low(0)

   tends to produce

   Patriarchal Risk = High(0)

2) Patriarchal Risk = High(0) OR Divorce Threat = Present(0)

   tends to produce

   Wife's Bargaining Power = Low(0)

3) Wife's Bargaining Power = Low(0)

   tends to produce

   Wife's Fertility Demand = High(0)

Hypothesis: Causal Chain 2

Positive Instances:

1) Socio-economic Positioning = High(1)

   tends to produce

   High-Fertility Related Positive Social Sanctions = Low(1)

2) High-Fertility Related Positive Social Sanctions = Low(1)

   tends to produce

   Wife's Fertility Demand = Low(1)

Negative Instances:

1) Socio-economic Positioning = Low(0)

   tends to produce

   High-Fertility Related Positive Social Sanctions = High(0)

2) High-Fertility Related Positive Social Sanctions = High(0)

   tends to produce

   Wife's Fertility Demand = High(0)

5.3.1 – An Overview of Theory Relevant to the Model

First, because Model 3: Bargaining and Social Norms contains two distinct hypothesised causal chains, a brief overview of theory relevant to the model is provided before directly examining issues of conceptualisation and operationalisation.

The Opportunity Cost of Women's Time

Conventional economic approaches to fertility assume that technological changes, particularly the decreased importance of physical strength in production, facilitate women's entry into new employment activities outside the home, thereby increasing the opportunity costs of childcare and motivating a reduction in fertility (Folbre 1983:262; Braunstein & Folbre 2001:29). A variant of this thesis posits that increases in women's education raises the wages rates they can command, thus increasing the opportunity costs of their time and lowering their fertility demand (Mason 2001:166). The emphasis placed by conventional household economists on the relationship between the value of women's time and the costs of children supports the long-held view that the social status of women and their economic independence might be an important explanatory mechanism between economic modernisation and fertility decline (Cleland & Wilson 1987:8).

Theories of fertility based on the opportunity cost of women's time however appear to offer little of relevance for the context of Bangladesh. Across Bangladesh 85% of women do not work, and of those that do the highest proportions are to be found in the lowest and highest wealth quintiles (14.9% and 15.6% respectively) and in the lowest and highest educational attainment categories (15.5% and 20.2% respectively) (NIPORT et al. 2013:40). Yet the total fertility rate (TFR) of women located in the lowest wealth quintile (TFR 3.1) and lowest educational attainment category (TFR 2.9) are the highest TFRs across these classifications, whilst the TFR of women located in the highest wealth quintile (TFR 1.9) and highest educational attainment categories (TFR 1.9) are the lowest TFRs across these classifications (NIPORT et al. 2013:62). Women's employment, and the opportunity cost of their time, therefore appears to have little relevance to the formulation of fertility demand and fertility outcomes in

Bangladesh. Instead, alternative possible pathways through which Socio-economic Positioning might impact fertility demand need to be examined.

Causal Chain 1: Socio-economic Positioning, Patriarchal Risk and Bargaining Power in Marriage

One possible pathway which appears to offer more explanatory plausibility for the link between Socio-economic Positioning and fertility demand is provided by the hypothesis that men with increased Socio-economic Positioning marry women who, from similar backgrounds (see Buss 1985), experience reduced levels of patriarchal risk (see Cain et al. 1979) and thus have better fallback positions (put simply, economic prospects) outside of marriage which serve to elevate their bargaining power within marriage (see Manser & Brown 1980; McElroy & Horney 1981). This elevated bargaining power might then result in women demanding a lower level of fertility. The theories and posited incentives that underlie the mechanisms on this particular pathway are discussed further below in the sections of Condition 3: Patriarchal Risk and Condition 4: Wife's Bargaining Power at Start of Marriage.

Causal Chain 2: Socio-economic Positioning and Fertility-Related Social Sanctions

Another possible explanatory pathway for the link between Socio-economic Positioning and fertility demand posits that increased Socio-economic Positioning reduces positive social sanctions for high-fertility outcomes. The mechanism on this alternative pathway is discussed further below in the sections of Condition 5: High-Fertility Related Positive Social Sanctions At Start of Marriage.

5.3.2 - Conceptualisation and Operationalisation of Exogenous Condition 1: Socio-economic Positioning

This section examines theory and concepts, operationalisation and the logical engineering for Exogenous Condition 1: Socio-economic Positioning.

Socio-economic Positioning

On the basis that men and women of similar socioeconomic status tend to marry (Buss 1985), and given that 85% of women in Bangladesh do not work (see NIPORT et al. 2013:40) the operationalisation of Socio-economic Positioning for the family unit appears more appropriately focused on the characteristics of the Husband. Also, women's educational attainment by itself has an almost universal negative association with fertility across a wide range of country settings (see Martin 1995), and is the proxy most commonly used for women's status (Balk 1994:28), not family status. For this reason, Wife's educational attainment (quantity and 'quality') cannot appropriately be incorporated into Condition 1: Socio-economic Positioning without potentially conflating the two distinct concepts of women's status and family status.

Bollen, Glanville & Stecklov (2001:168) in a review of the conceptualisation of socioeconomic status in studies of health and fertility in developing countries note that when paternal or husband's education is included it is usually operationalised as a straightforward representation of household socioeconomic status by itself. However just as with Condition 1: Socio-economic Positioning in Model 2: Security Assets, only minor differences are anticipated in both the quantity and 'quality' of Husband's education across the respondents, and due to the expected weak linkage between education and income in the context under examination the incorporation of the indicator permanent income is also necessary.

Pre-Examination Operationalisation of Exogenous Condition 1: Socio-economic Positioning

The pre-examination operationalisation for Condition 1: Socio-economic Positioning is somewhat unusual because whilst as discussed, Husband's education in terms of quantity and 'quality' at the start of marriage are important aspects for this exogenous condition, they are also potentially important for the mechanism Condition 3: Patriarchal Risk further along the causal chain.

There are also temporal complications that arise with the inclusion of the indicator permanent income in Condition 1: Socio-economic Positioning because the indicator relates to the time at which the respondents were interviewed but the condition relates to the start of marriage. Whilst this does not pose such as serious issue for Condition 1: Socio-economic Positioning in Model 2: Security Assets because the condition there relates to the entire period spanning the childbearing phase (because the ability to 'purchase' security through the entire phase is relevant there), in this model the mechanisms subsequent to Condition 1: Socio-economic Positioning are assumed to remain more or less static in their values established at the start of marriage. Permanent income defined as being at the start of marriage and indicated by the number of rooms used by the family for sleeping however is inappropriate, especially considering that some of the respondent couples were living in co-residential arrangements with extended family during their childbearing phase.

As such, the pre-examination operationalisation of Condition 1: Socio-economic Positioning is floating and based on the potential incorporation of Husband's quantity and 'quality' of education, and of permanent income, in post-examination operationalisation.

Post-Examination Operationalisation of Exogenous Condition 1: Socio-economic Positioning

Post-examination, it was considered appropriate to incorporate Husband's quantity of education at the start of marriage (see additional discussion further below in Condition 3: Patriarchal Risk) as well as permanent income as indicated by the number of rooms used for sleeping by the family at the time of interview (see discussion in Condition 1: Socio-economic Positioning in Model 2: Security Assets) into Condition 1: Socio-economic Positioning of this model. Whilst acknowledging that the incorporation of permanent income is far from ideal due to the temporal issue discussed, it could be viewed here as a proxy for the Husband's income generating potential or capacity at the start of marriage. On balance it appears more appropriate to include this aspect rather than to exclude it in the operationalisation of Condition 1: Socio-economic Positioning in this model.

Concept Logical Engineering Notes

Since the operationalisation, data and logical engineering of Condition 1: Socio-economic Positioning in this model is identical to that of Condition 1: Socio-economic Positioning in Model 2: Security Assets, the final values of the latter are simply brought over.

5.3.3 - Conceptualisation and Operationalisation of Exogenous Condition 2: Divorce Threat

This section examines theory and concepts, operationalisation, case selection and the logical engineering for Exogenous Condition 2: Divorce Threat. The possible relationship between Divorce Threat and bargaining power is briefly highlighted first.

Divorce Threat and Bargaining Power

In divorce threat bargaining models the threat point or fallback position refers to the maximum utility a married individual can attain in the event of divorce, and this is argued to shift the balance of bargaining power within marriage accordingly (Manser & Brown 1980; McElroy & Horney 1981).

Pre-Examination Operationalisation of Exogenous Condition 2: Divorce Threat

Condition 2: Divorce Threat was initially operationalised with indicators relating to the couple's form of marriage: whether the couple are unrelated (divorce without extended family sanctions), related (with the possibility of extended family sanctions against divorce), or unrelated and had an exchange marriage (in which two men marry each other's sister with the possibility of retaliatory sister divorce), and with the Wife's perceived ranking of the likelihood of divorce by form of marriage generally for women living in the same neighbourhood as the Couple at the start of marriage if no child was born within three years of marriage.

The emphasis of this operationalisation was upon the relative difficulty with which the Husband might effect the actual process of divorce under the assumption that the Wife's threat point will virtually always be substantially lower than that of her Husband in the context under examination. Therefore, rather than focusing on the relative threat points of Husband and Wife, the focus was on the relevancy of the threat point based on the reasoning that if the possibility of divorce for a particular woman is very low anyway, then regardless of precisely how low her actual threat point is, she should have higher levels of bargaining power within marriage when compared to a woman with a roughly similar threat point who is more exposed to the possibility of divorce.

During the course of fieldwork however it was discovered that marriage between relatives amongst Hindus is socio-religiously proscribed, and exchange marriage amongst both Hindu and Muslim communities of which the respondents were part of was extremely rare.

Post-Examination Operationalisation of Exogenous Condition 2: Divorce Threat

Hindu Couples 22, 12, 50 and 8 found it difficult to answer questions relating to divorce, and as a consequence many responses to divorce related questions were noted as 'unknown'. Except for Husband 22 who offered no comments on the issue, each of these respondents explained that they had never seen/heard of any divorces occurring amongst Hindus in their neighbourhood. Husband 8 explained that Hinduism forbids divorce and his neighbours follow Hinduism strictly, including this specific aspect of Hinduism relating to divorce, and also added that if a Hindu man's wife does not have a child, he can marry another woman without having to divorce the first wife. This respondent's view of marriage and divorce in Hinduism is consistent with that put forward by Nicholas (1995:140) who describes the Hindu concept of marriage in the context of Bangladesh as that of a permanent transformation of two separate persons into a single body and notes "At the most generally shared level of Bengali Hindu culture, the marital transformation is considered irreversible. However, it is also asymmetrical: a woman cannot be made into the half body of a man for a second-time, while a man may take additional wives." (Nicholas 1995: 140).

In contrast, Muslim Couples 44, 28, 33 and 60 had no difficulties in answering divorce related questions. Although Wife 44 did state she had not heard of divorce occurring in her neighbourhood, her Husband (44) explained in his interview that upon divorce, a meeting of society elders occurs to facilitate the return of dowry to the divorced woman's family. Islam permits divorce (Quran verse 65:1).

Divorce Threat was re-operationalised with the indicator socio-religious possibility of divorce. If the possibility of divorce is absent altogether for Hindu women then it follows that their threat points are causally irrelevant and their bargaining power within marriage should be far higher than their Muslim counterparts with similar threat points but who are exposed to the possibility of divorce.

Case Selection

Case selection did not proceed on the basis of the pre-examination operationalisation of Divorce Threat based on the indicator relating to different forms of marriage because the different forms anticipated were virtually non-existent in the context under consideration. Couples were however purposively selected on the basis of their Hindu or Islamic religious affiliation with the aim of examining two Hindu and two Muslim couples exhibiting a low value for Condition 4: Fertility Outcome in Model 4: Family Planning (the ultimately dependent outcome of the entire framework), and two Hindu and two Muslim couples exhibiting a high value for this condition, with all also exhibiting the appropriately hypotheses-compliant values for the exogenous conditions or aspects of them being selected on, in order to scope any results arrived at in this study as potentially applicable to both Hindus (a sizeable minority) and Muslims (the majority) in the population of interest.

Concept Logical Engineering Notes

One major analytical implication of the re-operationalisation of Condition 2: Divorce Threat as indicated by religion of the household head, which was the Husband in all cases, is that whilst the condition was rendered a highly concrete exogenous condition, only two of the four Hindu couples examined exhibit hypotheses-compliant values for an absent Divorce Threat ultimately resulting in a low Fertility Outcome (ID 12 & 8) and only two of the four Muslim couples examined exhibit hypothesis-compliant values for a present Divorce Threat ultimately resulting in a high Fertility Outcome (ID 44 & 33). This reduction in the number of cases however poses no issue for the two elimination procedures later in the analysis phase of the study.

5.3.4 - Conceptualisation and Operationalisation of Mechanism Condition 3: Patriarchal Risk

This section examines theory and concepts, operationalisation and the logical engineering for Mechanism Condition 3: Patriarchal Risk. The possible relationship between Patriarchal Risk, women's status and fallback positions is discussed first.

Patriarchal Risk, Women's Status and Fallback Positions

Cain et al. (1979) define patriarchy as "a set of social relations with a material base that enables men to dominate women" (Cain et al. 1979:406) and assert that in Bangladesh it describes a distribution of power and resources within families such that it is men who maintain power and control of resources rendering women powerless and dependent on them. The material base of this patriarchy is the control by men of property, income and women's labour (Cain et al. 1979:406). Women face special, patriarchal risks: as the bonds of kinship erode under the pressure of poverty there is a heightened risk of abrupt decline in status for women, and women who have no male on whom they can depend and have to seek employment face a labour market which is both spatially and functionally restricted entailing low wages and high rates of unemployment (Cain et al. 1979:432). Also, because men dominate political, administrative and law enforcement domains, and formal judicial and administrative institutions are weak, the legal system affords little protection to women (Cain et al. 1979:407). The diminished physical security of women compared to men is therefore also a particular source of patriarchal risk.

Cain et al. (1979:409, 432-3) argue that patriarchal risk presents powerful systemic incentives to women for high fertility and assert that under these circumstances, especially with the "almost guaranteed" (Cain et al. 1979:409) prospect of widowhood for most women due to large differences in age at marriage between husband and wife, "The best risk insurance for women.... is to produce sons, as many and as soon as possible" (Cain et al. 1979: 433). The desire to have as many sons as possible will therefore tend to increase overall fertility because in contrast to the desire to attain a target number of children of either sex, the desire to produce a target number of sons

will almost always carry with it the consequence of also producing daughters, resulting in continued fertility until the required number of sons is achieved.

Cain (1984:36-7) considers improvements in female educational attainment and employment as reflective not of changes in the patriarchal structure but of a more inherently flexible type of patriarchy and posits that such improvements can increase women's' age at marriage thereby resulting in lower fertility (due to their shortened duration of exposure to childbearing) (see also Bongaarts 1978, 1982), in reducing child mortality which induces a decline in fertility (because now fewer children are required borne to achieve a certain number or sex composition of living children) (see also Notestein 1945), and in increasing the opportunity costs of children which exerts a negative influence on fertility (see also Folbre 1983:262; Braunstein & Folbre 2001:29; Mason 2001:166).

An alternative pathway from higher levels of women's status indicated by educational attainment and employment to low fertility however is suggested by divorce threat bargaining models (Manser & Brown 1980; McElroy & Horney 1981). The main theoretical thrust of these models posits that women with low fallback positions (economic prospects) outside of marriage have lower bargaining positions within marriage because they have greater incentives to compromise in order to avert the prospect of divorce, whereas women with high fallback positions which allow economic self-sufficiency outside of marriage will have incentives to exit marriage if the 'payoff' from its continuance declines to the extent that they are better off outside of marriage (Manser & Brown 1980; McElroy & Horney 1981; McElroy 1990). Consistent with this theoretical thrust, Mason (1987:724) notes the potential for educational attainment and premarital employment to influence the extent of autonomy a woman has as a wife after marrying, and points to common positive associations between female economic autonomy gained through employment and marital disruption in highly diverse contexts such as that of the United States and Central Java.

Cain et al.'s (1979) concept of patriarchal risk is virtually identical in causal implication for a woman's bargaining power within marriage to that of McElroy's (1990) 'extrahousehold environmental parameters' and Folbre's (1997) 'gender-specific

environmental parameters' as applied to divorce threat bargaining models, and can thus appropriately be integrated into these types of model.

Pre-Examination Operationalisation of Mechanism Condition 3: Patriarchal Risk

The life cycle period of relevance for Condition 3: Patriarchal Risk is considered to be the start of marriage on the basis that it will establish the initial balance of bargaining power within marriage and that this balance of power will tend to remain largely unaltered under normal and environmentally stable circumstances. The level of Patriarchal Risk a woman is subject to is unlikely to change significantly over the childbearing phase from what it was at the start of marriage.

In studies examining the status of women and fertility, education is the proxy that is most commonly used for women's status (Balk 1994:28) and is incorporated therefore as an indicator of the extent of Patriarchal Risk the Wife is exposed to.

Employment experience before the start of marriage may also increase employability at the fallback position even if no employment occurs during marriage. Whilst Mason (1987:723) points to the consequences of premarital employment such as changes in the aspirations, attitudes and independence of women which are argued to thereby promote a later age at marriage taken as the intervening mechanism that reduces fertility (see also Bongaarts 1978, 1982), here premarital employment is viewed as a factor which can not only potentially increase employability at the fallback position due to higher levels of employment experience, but also as a factor which eliminates the psychic costs associated with the otherwise unfamiliar prospect of having to engage in employment activities if necessary outside of marriage – the fear of the unfamiliar is eliminated. Therefore employment indicators are incorporated with the aim to capture both the Wife's employment experience before the start of marriage as well as the duration and type of work that was undertaken.

Lastly, given Cain et al.'s (1979:407) assertion that the legal system in Bangladesh affords little protection for women, with the implication that physical safety is another source of dependency by women on men, indicators which aim to capture the

perceptions of both Husband and Wife in relation to the relative exposure of women and men to general security risks are incorporated.

Although many studies incorporate women's education and employment as proxies for women's status (Durrant & Sathar 2000:6), Malhotra Schuler & Boender (2002:8) point out that that there is growing understanding that this is problematic because these indicators are better viewed as enabling factors or sources of women's empowerment. In this model, Patriarchal Risk or women's status is conceptualised in terms of a woman's fallback position outside of marriage, whilst her level of bargaining power within marriage is considered as a distinct concept and as a causal consequence of Patriarchal Risk.

Whilst some commentators argue that in the assessment of women's status their educational attainment or employment needs to be contrasted against those of men, others argue that absolute levels of women's educational attainment or employment are in of themselves suitable as indicators of the autonomy or dependency that women are likely to experience in relation to men such that, for example, literacy is expected to enable women's access to knowledge that improves their bargaining power in relation to men even if men typically have higher levels of educational attainment (Mason 1987:720-1). Balk (1994:23) also points out that the assessment of women's status can be based on a comparison of the relative position of women to men, or alternatively through a comparison of women to other women.

With the Husband assumed to have employment experience before marriage (which in the context under investigation would have enabled him to get married), his education quantity and 'quality' at the start of marriage are incorporated as indicators for potential comparison against those of the Wife.

Post-Examination Operationalisation of Mechanism Condition 3: Patriarchal Risk

Given that women's status can be examined either in relation to men, in relation to other women or in absolute terms (see Mason 1987:720-1; Balk 1994:23), the removal of the initially incorporated Husband's quantity and 'quality' of education at the start of marriage as indicators for possible comparison against those of the Wife (see

operationalisation notes for Condition 1: Socio-economic Positioning) poses no problem in the post-examination operationalisation of Condition 3: Patriarchal Risk.

By incorporating the Wife's quantity and quality of education on its own in the operationalisation of Patriarchal Risk, the focus by default is squarely and exclusively upon her fallback position outside of marriage, which remains the same regardless of her Husband's educational attainments, and actually appears to provide for a more crisp and distinct operationalisation in this regard.

Concept Logical Engineering Notes

The logical engineering process produced a post-examination operationalisation for Condition 3: Patriarchal Risk based on a combination of Wife's ever employment before the start of marriage and Wife's educational attainment at the start of marriage.

5.3.5 - Conceptualisation and Operationalisation of Mechanism Condition 4: Wife's Bargaining Power at Start of Marriage

This section examines theory and concepts, operationalisation and the logical engineering for Mechanism Condition 4: Wife's Bargaining Power at Start of Marriage. The possible relationship between Bargaining Power, women's empowerment and fertility is discussed first.

Bargaining Power, Women's Empowerment and Fertility

Much of the literature examining gender and demographic change has been focused on gender stratification or on its sub-concepts such as female autonomy, women's empowerment, control of material resources or their freedom of mobility (Mason 1995:8). Balk (1994) in a study of women's status and fertility in rural Bangladesh finds that two aspects of women's status, women's mobility and the leniency of her household towards her in terms of allowing certain activities such as visiting relatives, taking a sick child to a clinic outside the village and earning money, predict fertility at both the individual and village level.

Malhotra et al. (2002:5-8) in a review of the conceptualisation of women's empowerment in studies focused on international development find a nexus of the four key overlapping terms: options, choice, control and power, and note that the core concept of agency, which encapsulates the ability to make strategic choices and control decisions and resources that affect important life outcomes, lies at the heart of many conceptualisations of women's empowerment.

Sen (1987:6, 10) argues that perceptions of self-interest, whilst important because they have an influence and sometimes a major impact on actual states and outcomes, cannot be considered definitive guides to self-interest and well-being particularly in contexts such as India in which family identity exerts such a strong influence on perceptions of well-being that it is difficult for a person to formulate any clear notion of his or her individual welfare. Sen (1987:8) therefore argues that there are objective aspects of self-interest and well-being that demand attention, and that the well-being of a person should be seen in terms of functionings and capabilities, that is, what a

person is able to do or be, for example the ability to be well nourished and to avoid escapable morbidity or mortality.

In view of the importance of agency as a central concept in the study of women's empowerment, and the necessity of employing objective measures of well-being, a woman's bargaining power within the family appears most appropriately indicated in terms of her ability to make choices regarding objectively specified issues of importance to well-being and self-interest. In other words it is a woman's power to make important choices or her freedom from the control of others, particularly family or household members, that appropriately indicates bargaining power (Dyson & Moore 1983 cited in Mason 1986:285). An important aspect of well-being and self-interest relates to issues of health (see Sen 1987:8). Therefore, because the outcome of this model is Wife's Fertility Demand, and because it is the Wife who solely bears the maternal health risks associated with her fertility, the Wife's agency in decisions relating to her maternal health vis-à-vis the decision making power of family members with regards to her maternal health is considered an important area of focus.

The use of women's employment as a proxy for economic empowerment or the control of material resources is questionable, particularly in patriarchal societies, because a woman who earns income will not necessary have control over the use of that income and contributions to family income may not necessarily result in higher levels of economic decision making in the family: the primary identity and role as a dutiful wife may prevent any change in their autonomy or household decision making, wives might automatically give their income to husbands or mother-in-laws who then exercise decision making power, or families may be so poor that all income is immediately spent on necessities allowing no room for discretionary spending (Mason 1995:10). However, although a woman's status of employment is, in of itself, questionable as an indicator of empowerment, a woman's agency in relation to her employment status, that is, her ability to stop or start employment regardless of the existing status appears to bypass these issues.

The mobility of women is an important and frequent dimension examined in the literature on women's empowerment (see Balk 1994; Mason 1986; Mason 1995). Cain et al. (1979:408) emphasise the restrictions on women's mobility in the context of

norms of purdah in Bangladesh. Therefore the agency of the Wife in terms of freedom of movement is another important aspect of her bargaining power.

The age difference between Husband and Wife is theoretically relevant to fertility in a number of ways. First, a large age difference might provide the younger Wife with incentives for high fertility in order to provide for old age support in contexts such as that of South Asia where widow remarriage is rare (Mason & Taj 1987: 618). Second, women who marry at a young age are subject to lengthier periods of exposure to pregnancy (Bongaarts 1978, 1982; see also Mason 1987:722). Third, Cain et al. (1979:407) note that in Bangladesh age differences of nearly ten years between spouses place women in a position of subordinacy to their older husbands from the outset of marriage. Cain (1984:39) in fact adopts the difference in age at marriage between men and women as a proxy for patriarchal structure. The difference in age at marriage between Husband and Wife can therefore be viewed as a proxy for bargaining power.

Pre-Examination Operationalisation of Mechanism Condition 4: Wife's Bargaining Power at Start of Marriage

The period of relevance is the start of marriage on the assumption that the balance of bargaining power established within the couple at the start of marriage will continue without significant change during the child bearing phase, the period during which fertility decision making occurs.

A number of indicators of the Wife's agency in terms of a variety of important objectively specified decisions are incorporated in the pre-examination operationalisation. First are indicators specified in terms of agency in choice of maternal healthcare in relation to other family members in the decisions made with regards to the Wife's first childbirth, as to the delivery setting, with regards to who (the person) would deliver the baby, and additionally a possible weighting factor consisting of the Wife's knowledge of the adverse experiences of maternal mortality, stillbirth or neonatal mortality amongst her own and her Husband's extended family on the basis that knowledge of such experiences would tend to render the importance of maternal healthcare decisions all the more important to her. Second, the Wife's

agency in terms of her ability to change her employment status. Third, the Wife's agency in terms of mobility attempts to capture both explicit and implicit restrictions by family members on her desired mobility. Fourth, the Wife's relative age disadvantage in relation to her Husband aims to capture the relative maturity disadvantage of the Wife at the start of marriage.

Concept Logical Engineering Notes

The logical engineering process produced a near-perfect compliance across the cases for theoretically consistent values of Condition 4: Wife's Bargaining Power at Start with the values of Dependent Outcome: Fertility Outcome in Model 4: Family Planning, through the post-examination operationalisation of Wife's Bargaining Power at Start based plausibly and parsimoniously on the sole indicator Wife's relative age disadvantage at start.

5.3.6 - Conceptualisation and Operationalisation of Mechanism Condition 5: High-Fertility Related Positive Social Sanctions at Start of Marriage

This section examines theory and concepts, operationalisation and the logical engineering for Mechanism Condition 5: High-Fertility Related Positive Social Sanctions at Start of Marriage. The possible relationship between social norms and fertility is discussed first.

Social Norms and Fertility

Dyson & Moore (1983:48) with regards to northern India note that a woman's standing amongst her husband's family undoubtedly improves upon the production of sons, and Mason (1987:729) notes similarly that in contexts in which a woman marries into an extended-kin household of strangers without access to the economic and social support of her natal kin or without an independent economic base, her security and respect is gained through the birth of at least one child or son. Mason & Taj (1987:618) however argue that even where gender-based divisions of labour and power are extreme, personal welfare might be viewed as resting more on family welfare than on the circumstances that are peculiar to each sex thereby inducing men and women to form very similar fertility goals, and that tradition or socialisation might have a similar result: community norms in relation to the desirability of a certain number of children or sons, or fertility control, may induce men and women to have similar fertility goals because their individual goals have been shaped and formed by the same values and norms.

The two hypotheses are not mutually exclusive – if norms are responsible for shaping the desirability of a certain number or sex composition of children for a couple, then the satisfaction of this fertility norm will not only reap the couple rewards in the form of positive social sanctions and the failure to do so expose them to negative social sanctions (see White 2004:102; Munshi & Myaux2006: 4-5), but the wife's status within the family will likely similarly rise or fall in contexts such as Bangladesh where the wife is more likely to be held to accountable for 'fertility performance' (see Nahar & Richters 2011).

Whilst rejecting Becker's (1960) 'children as consumer durables' model as appropriate in the formulation of the 'demand' for children, Blake (1968) asserts that social norms influence the formulation of preferences not only for the quantity of children but also the 'quality' of children. Not only are 'tastes' in children subject to social influence but there are normative prescriptions to produce children whose behaviour remains within the law and provide them with education, with standards of child 'quality' becoming increasingly demanding as one goes up the social scale (Blake 1968:18-20). Thus more affluent parents are motivated to invest increasing amounts to 'produce' higher 'quality' children because they feel obligated to provide their children with the competitive advantages of their class (Blake 1968:20). This type of child 'quality' driven fertility incentive, shaped by social norms, might then place downward pressure on demand for the quantity of children.

Given the hypothesis in Causal Chain 2 of this model that differences in Condition 1: Socio-economic Positioning produce differing values for Condition 5: High-Fertility Related Positive Social Sanctions at Start of Marriage which in turn then acts to drive differences in Condition 6/Outcome 1W: Wife's Fertility Demand, it is important that both the Husband and Wife have a clear and congruent perception of what these norms are, since if there is disagreement between them this would suggest that any such norms or perceptions of these norms are not sufficiently strong enough, or clear enough, to affect the Wife's Fertility Demand. In other words, the social norms relating to fertility have to be effective norms rather than ineffective norms that fail to motivate (see Mason 1983:316). The Wife's own perceptions of these norms in driving the formulation of Wife's Fertility Demand in disjuncture to those held by the Husband promises no yield either in terms of positive social sanctions for the family as a whole or in the elevation of her status within the family through her reproductive effort.

Pre-Examination Operationalisation of Mechanism Condition 5: High-Fertility Related Positive Social Sanctions at Start of Marriage

The period of relevance is the start of marriage on the assumption that social norms will not change considerably enough over the childbearing phase to make a significant difference to fertility decision making.

In the social constructionist approach to norms, personal feelings of right and wrong are irrelevant to the effectiveness of norms, and because norms gain force through sanctions, the appropriate approach to their measurement lies in assessing perceptions and attitudes amongst respondents as to how other people evaluate certain behaviours or outcomes (see Mason1983:319). Accordingly, the perception of social respect to be gained from varying fertility outcomes is examined in the operationalisation of Condition 5: High-Fertility Related Positive Social Sanctions at Start. Rather than son preference, son/daughter preference is incorporated with the aim of capturing any perceived social preferences for either sex. Son or daughter preference is hypothesised to increase (the effective) Wife's Fertility Demand because even though, for example, she might have a low demand for children of a particular sex, attaining this target will most likely entail having more children than she would ideally prefer (see Cleland et al. 1994:48).

Concept Logical Engineering Notes

Logical engineering produced a post-examination operationalisation for Condition 5: High-Fertility Related Positive Social Sanctions at Start based on the frequency of the analytically combined (but individually provided) responses by the Couple with regards to their perception of social preferences as to the sex composition of children and the quantity of children produced by a couple living in the same neighbourhood as them at the start of their marriage.

5.3.7 - Conceptualisation and Operationalisation of Mechanism Condition 6/Outcome 1W: Wife's Fertility Demand

This section examines theory and concepts, operationalisation and the logical engineering for Mechanism Condition 6/Outcome 1W: Wife's Fertility Demand.

Wife's Fertility Demand

Wife's Fertility Demand is hypothesised to result through two possible proximate conditions.

First, situated on Causal Chain 1, Condition 4: Wife's Bargaining Power at Start is hypothesised to impact Wife's Fertility Demand on the basis that women are exposed to unique costs in having children in terms of pain, exhaustion and increased risks of morbidity and mortality that are associated with pregnancy, childbirth and breastfeeding (Mason & Taj 1987:613). Due to this unique exposure to the burden and risk of childbearing and child rearing, it is frequently assumed that women have a latent lower demand for children when compared to men (Raftery, Lewis & Aghajanian 1995:161-2; Cleland et al. 1994:55). Therefore, Wife's Bargaining Power at Start is hypothesised to have an inverse relationship with Wife's Fertility Demand.

Second, situated on Causal Chain 2, Condition 5: High-Fertility Related Positive Social Sanctions at Start is hypothesised to impact Wife's Fertility Demand on the basis that social sanctions provide incentives for the Wife to comply with fertility norms in order to reap the potential advantages of both elevating the status of the family unit within society and her own status within the family. Therefore, High-Fertility Related Positive Social Sanctions at Start is hypothesised to have a positive relationship with Wife's Fertility Demand.

Pre-Examination Operationalisation of Mechanism Condition 6/Outcome 1W: Wife's Fertility Demand

Whether being produced by Condition 4: Wife's Bargaining Power at Start, and thus primarily through incentives driven by considerations of personal well-being and self-interest, or Condition 5: High-Fertility Related Positive Social Sanctions at Start, and

driven by a mixture of incentives that relate to the well-being of both the family unit and self, the Wife should have clear and well defined fertility preferences from the very start of marriage and during the childbearing phase. Operationalisation therefore incorporates the Wife's fertility demand for sons and daughters at the start of marriage, preference for a son or daughter before the birth of each child, the final fertility demanded, unwanted fertility to establish the difference between the actual fertility outcome and whether there was a desired ceiling which was over-shot, unrealised fertility incidences (miscarriages and stillbirths) which may cause an adjustment of fertility demand in view of the health risks for the Wife, the mortality of live-born children which may impact demand for the number of children born with a view to attaining a certain target of living children through 'replacement' children, and child permanent injury which may also have the same impact on demand.

Concept Logical Engineering Notes

Logical engineering produced a post-examination operationalisation for Condition 6/Outcome 1W: Wife's Fertility Demand based on a very specific formulation involving the indicators Dynamic Son/Daughter Preference Based Fertility Demand, Unrealised Fertility (miscarriages or stillbirths), and Fertility Demand at the Start of Marriage. This formulation will be discussed at length later in the study.

5.3.8 - Model Level Summary

The table presents the logical engineering results for all the conditions of each case in relation to Model 3: Bargaining and Social Norms.

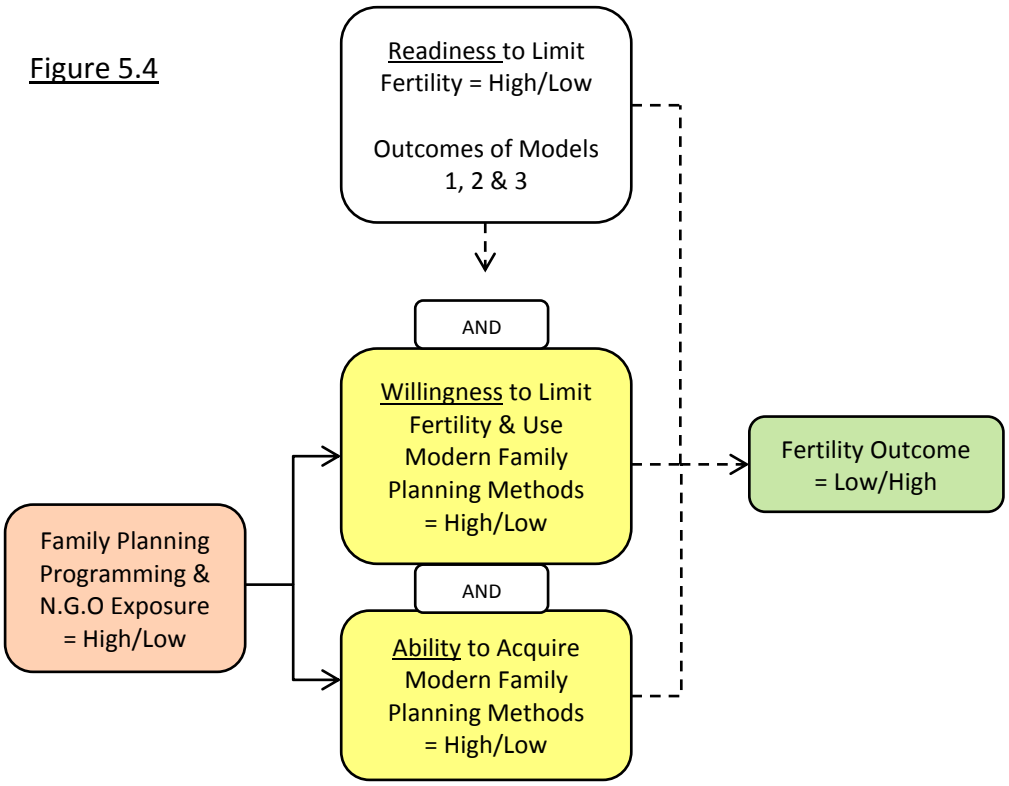
Table 5.3	**Model 3: Bargaining and Social Norms, Logical Engineering Results**							
Conditions:	**Case ID:**							
	44	**28**	**33**	**60**	**22**	**12**	**50**	**8**
Condition 1: Socio-economic Positioning High(1) Medium(--) Low(0)	--	1	0	--	--	0	1	--
Condition 2: Divorce Threat Absent(1) Present(0)	0	0	0	0	1	1	1	1
Condition 3: Patriarchal Risk at Start Low(1) Medium(--) High(0)	--	1	--	1	0	--	0	0
Condition 4: Wife's Bargaining Power at Start High(1) Medium(--) Low(0)	0	0	0	1	0	1	0	1
Condition 5: High Fertility Positive Social Sanctions at Start Low(1) Medium(--) High(0)	0	--	--	1	--	1	--	--
Condition 6 Outcome 1W: Wife's Fertility Demand Low(1) Medium(--) High(0)	0	1	1	1	--	1	1	1

5.4 - Model 4: Family Planning

The conceptualisation and operationalisation of Model 4: Family Planning is now presented, starting with a diagrammatic representation of the model and the specification of hypotheses. Next, in separate sections for each condition, the conceptualisation and operationalisation of each condition is discussed in detail, with case selection notes when relevant to the condition, and logical engineering notes. Finally, a summary of the logical engineering results for the model presents all the values assigned to each condition of each case in tabular format.

Figure 5.4

Model 4: Family Planning



Note: dashed arrows indicate framework level hypotheses

Hypotheses

Positive Instances:

1) Family Planning Programming & N.G.O Exposure = High(1)
   tends to produce
   Willingness to Limit Fertility & Use Modern Family Planning Methods = High(1)
   AND
   Ability to Acquire Modern Family Planning Methods = High(1)

Negative Instances:

1) Family Planning Programming & N.G.O Exposure = Low(0)
   tends to produce
   Willingness to Limit Fertility & Use Modern Family Planning Methods = Low(0)
   AND
   Ability to Acquire Modern Family Planning Methods = Low(0)

5.4.1 - Conceptualisation and Operationalisation of Exogenous Condition 1: Family Planning Programming & N.G.O Exposure

This section examines theory and concepts, operationalisation and the logical engineering for Exogenous Condition 1: Family Planning Programming & N.G.O Exposure. The discussion proceeds with a particular focus on Family Planning in Bangladesh.

Family Planning in Bangladesh

From the 1970s the Bangladesh family planning programme through its information, motivation and communication activities engaged in an intensive campaign to promote the adoption of family planning (Cleland et al. 1994:82). Cleland et al. (1994:81-83, 121, 134) reject the thesis that socioeconomic or structural factors were the major drivers of the fertility decline in Bangladesh, and argue instead that latent demand for reduced fertility, driven by reductions in mortality and the corresponding increase in child survival, already existed. The Bangladesh family planning programme

was premised on the view that couples already wanted to limit fertility but were failing to do so due to the excessive costs of contraception, with costs broadly defined to include direct costs related to the purchase of contraceptive commodities and services, indirect costs such as travel expenses and the opportunity cost of time involved in their acquisition, subjective social, familial and personal costs, as well as costs in the form of subjective and objective concerns about the implications for health of adopting contraception (Cleland et al. 1994:84-85, 103).

The key aim of the Bangladesh programme was therefore to mitigate these costs of fertility regulation by providing convenient and subsidised family planning services through conveniently located outlets and outreach services provided by fieldworkers (Cleland et al. 1994:85, 103, 115).

Outreach services not only provided a readily accessible supply of contraception but also addressed acceptability by providing social support for the use of contraception (Cleland et al. 1994:115). Mass communication and publicity efforts were geared towards legitimising family planning practise and countering familial constraints (Cleland et al. 1994:115, 124).

Cleland et al. (1994:134) argue therefore that the evidence for the fertility decline in Bangladesh suggests the relative importance and primacy of supply side factors, not demand-side factors:

“The crucial change that has taken place concerns acceptability of and access to birth control and *not* structural change that has driven down the demand for children” (Cleland et al. 1994:134, original emphasis)

In terms of the RWA framework (see Lesthaeghe & Vanderhoeft 2001), Readiness which relates to the demand for children (see Lesthaeghe & Vanderhoeft 2001:240) is examined in Models 1, 2, and 3 in this study. Model 4: Family Planning is based on Cleland et al.'s (1994) thesis as to the importance of supply side factors on fertility outcomes in Bangladesh and provides the analytical pathway from Fertility Demand (Readiness to limit fertility) in Models 1, 2 and 3 to the Fertility Outcome, and incorporates the concepts of Willingness to limit fertility which relates to considerations of the legitimacy and normative acceptability of limiting fertility and

using modern family planning methods, and Ability to limit fertility which relates to the accessibility of modern family planning methods (see Lesthaeghe & Vanderhoeft 2001:240-1).

It is therefore hypothesised that the level of Condition 1: Family Planning Programming and N.G.O Exposure positively determines the values of Condition 2: Willingness to Limit Fertility and Use Modern Family Planning Methods and Condition 3: Ability to Acquire Modern Family Planning Methods.

Pre-Examination Operationalisation of Exogenous Condition 1: Family Planning Programming & N.G.O Exposure

The life cycle period of relevancy for Family Planning Programming & N.G.O Exposure is from the start of marriage up till the last successful childbirth, the childbearing phase, because it is only during this period that such exposure has immediate relevancy to the Wife, is more likely to be considered seriously, and is therefore most likely to have an impact on her Willingness and Ability to attain her already established Fertility Demand.

In contrast, remembering that all respondents were purposively selected on the basis that their youngest child was over the age of 5 years and so undesired fertility was apparently being deliberately and effectively avoided by the respondents, Family Planning Programming and N.G.O Exposure in the period after the last successful childbirth is only relevant to facilitating the avoidance of unwanted pregnancies.

Operationalisation of Condition 1: Family Planning Programming & N.G.O Exposure proceeds with the incorporation of three core indicators.

First, the frequency of visits by fieldworkers for family planning services which is an indicator derived from women's questions 327-330 of the BDHS 2007 (NIPORT et al. 2009:293-4), but with the period of relevance modified appropriately to the childbearing phase.

Second, the exposure to family planning messages is derived from women's question 715 of the BDHS 2007 (NIPORT et al. 2009:317), again with the period of relevance appropriately modified.

Third, exposure to public sector programming and N.G.O family planning influences through contraceptive acquisition is derived from women's question 321 of the BDHS 2007 (NIPORT et al. 2009:292), modified for period of relevance, with less detailed answer options, and with a different focus here since the indicator here aims to capture indirect exposure to programming and N.G.O influences that might impact Willingness and Ability based on the source of contraceptive acquisition – it is unlikely that acquiring contraceptives through the private sector, for example a shop, would involve any such influencing exposure.

Case Selection Notes

Case selection did not involve any aspects of Condition 1: Family Planning Programming & N.G.O Exposure which is a floating condition.

Concept Logical Engineering Notes

The logical engineering process produced a post-examination operationalisation for Condition 1: Family Planning Programming & N.G.O Exposure based on the value frequency of the three indicators rather than on a particular combination of them.

5.4.2 - Conceptualisation and Operationalisation of Mechanism Condition 2: Willingness to Limit Fertility and Use Modern Family Planning Methods

This section examines theory and concepts, operationalisation and the logical engineering for Mechanism Condition 2: Willingness to Limit Fertility and Use Modern Family Planning Methods. The condition is split into two separate aspects, Willingness to Limit Fertility and Willingness to Use Modern Family Planning Methods, which are first discussed separately.

Willingness to Limit Fertility

Among the ideas in the literature examining ideational theories of fertility are the notions of fertility limitation in of itself, and of knowledge, attitudes and values about the adoption of modern contraception (Casterline 2001:10). Easterlin & Crimmins (1985:18) for example classify attitudes towards the general notion of fertility limitation and towards specific methods or techniques as two distinct aspects of the cost of fertility regulation. Psychic costs include feelings of guilt and anxiety (Cleland et al. 1994:87). Lesthaeghe & Vanderhoeft (2001:244) in relation to the Willingness to limit fertility specify the constituting concepts as that of the legitimacy of interfering with nature, belief in the power that individuals have to alter the natural order, the degree of internalisation of traditional beliefs and codes of conduct, and the severity of sanctions for the violation of these normative prescriptions even if these are imaginary and based for example on the fear of reprisal from avenging spirits. The basic issue addressed by Willingness therefore is the extent to which new forms of behaviour violate established beliefs and codes of conduct and the extent to which there is a willingness to overcome moral objections and fears (Lesthaeghe & Vanderhoeft 2001:241). Willingness however can only be relevant and have an impact on the translation of Fertility Demand to the Fertility Outcome during the childbearing phase, that is, up to the last successful childbirth – a change in Willingness that occurs subsequent to the last successful childbirth will only be able to influence the level of exposure to unwanted pregnancies.

Although ideational theories of fertility emphasise the psychic costs associated with the notion of limiting fertility, the notion that there might also be psychic costs

attached to additional fertility is apparently neglected. Women might have a particular number of children and then avoid further pregnancies due to new knowledge and insight of the adverse experiences of others with regards to their fertility. Personal knowledge of maternal mortalities, stillbirths or neonatal mortalities, particularly amongst relatives for whom the Wife might have higher levels of access and more intensive levels of interaction in such situations of adversity, might magnify the psychic costs of additional fertility and this may act to override any psychic costs held with regards to limiting fertility.

The concept of social influence refers to the effects of interpersonal interactions that derive their power mainly from the desire to avoid conflict within social groups, a primary human motivation (Montgomery & Casterline 1996:155). The psychic costs of limiting fertility include the anxiety a woman might be subject to about the (negative) perceptions held by her husband and relatives with regards to such decisions or behaviour (Cleland et al. 1994:87).

Similarly, the concept of 'social conformity' relates to the pressure to be similar to one's peers (Montgomery & Casterline 1995:155). Family planning programmes, apart from lowering the market costs of contraception and providing information, also aim to legitimise the notion of limiting fertility through contraceptive usage and thus aim to diminish the full force of impeding social barriers (Easterlin 1975: 56; Cleland et al. 1994:90). The fertility outcomes of peer groups are therefore potentially important with regards to the Wife's Willingness to Limit Fertility, and the type of peer group of most appropriate relevance appears to be that in which relationships are based on ties of emotion rather than geographical or kin proximity since the first type of peer group may effect particularly high levels of social influence on account of high levels of trust, respect for members in the group and their personal behaviour, and strong emotionally based incentives to conform.

Willingness to Use Modern Family Planning Methods

In addition to the psychic costs associated with the notion of limiting fertility, there are costs associated with the use of modern family planning methods, both market costs such as the time and money necessary to learn about and adopt the use of specific

methods as well psychic costs associated with the use of certain techniques (Easterlin 1975:56). The dissemination of information regarding specific methods is therefore an important feature of family planning programming which is specifically aimed at lowering the psychic costs associated with the use of contraception (Easterlin & Crimmins 1985:18; Cleland et al. 1994:89-90). Knowledge of modern contraceptive methods is therefore an important aspect in Willingness to Use Modern Family Planning Methods. The extent of such knowledge is likely on the one hand to determine the ease with which a woman can evaluate the various methods available to her and arrive at a decision to utilise one or the other, and on the other hand such knowledge in of itself may serve as a proxy for Willingness to Use Modern Family Planning Methods simply because the extent of Willingness may determine the extent of knowledge acquired. At the same time, increased levels of knowledge regarding specific methods may not allay any moral objections and conflicting internalised values, and may even attenuate these, and therefore it is equally important to consider internalised values with regards to the use of known methods, particularly if such objections were held during the childbearing phase.

One of the implications of lower levels of knowledge regarding specific methods is the discontinuation of contraceptive use when ill health occurs due to the perception that contraceptive usage may be the cause (Cleland et al. 1994:88). In Bangladesh the main reason for all discontinuations at 29.3% is concern about side effects/health (NIPORT et al. 2013:96). However, health concerns about the use of contraception can constitute a major psychic cost that prevents usage in the first place (see Montgomery & Casterline 1996:164). In Bangladesh 22.6% of married women aged 15-29 not currently using contraception and not intending to use them in the future state the main reason as 'health concerns' (10.3%), interference with the body's normal process (8.4%) or fear of side effects (3.1%) (NIPORT et al. 2013:102). All three of these reasons in essence relate to the psychic health costs of contraceptive use. Psychic health costs therefore constitute an important aspect of Willingness to Use Modern Family Planning Methods.

Just as with the notion of limiting fertility, the means employed to achieve fertility targets, that is, the choice of contraceptive method, can also be subject to social effects (Montgomery & Casterline 1996:163). In Bangladesh 10.8% of married women

aged 15-29 not currently using contraception and not intending to use them in the future state the main reason as opposition from the husband or partner (NIPORT et al. 2013:102). However, given the potential importance of the perceptions other family members with regards to the use of specific methods, particularly for women living in a joint family system, in similarity with the potential importance of family preferences regarding limiting fertility, consideration of the compatibility of known methods with the approval of other family members in addition to that of the Husband is appropriate.

In similarity with the potential influence of the fertility outcomes of peer groups with regards to the Wife's Willingness to Limit Fertility, group conformity in the use of a specific method is potentially relevant to the Wife's Willingness to Use Modern Family Planning Methods. For this particular indicator of Willingness, it is considered appropriate to examine current method usage rather than that which occurred during the childbearing phase on the basis that information available to the respondents on current method usage, both of their own and of members of their peer group, will tend to be more reliable than retrospective information and likely to be an appropriate proxy for conformity in the usage of specific methods generally over time.

Pre-Examination Operationalisation of Mechanism Condition 2: Willingness to Limit Fertility and Use Modern Family Planning Methods

The operationalisation of Willingness to Limit Fertility and Use Modern Family Planning Methods incorporates the following indicators:

Willingness to Limit Fertility:

Compatibility of limiting fertility with internalised values; Psychic costs associated with additional fertility after last successful childbirth; Conformity of the fertility outcome at last successful childbirth with family member fertility preferences; Group Fertility Outcome Norm

Willingness to use Modern Family Planning Methods:

Willingness to utilise available modern family planning methods; Compatibility of known methods with internalised values; Psychic health costs associated with the use of known methods; Compatibility of known methods with family approval; Conformity with group member usage of the main contraceptive method used

Concept Logical Engineering Notes

The logical engineering process produced a post-examination operationalisation for Condition 2: Willingness to Limit Fertility and Use Modern Family Planning Methods based solely on the value for the indicator Group Fertility Outcome Norm.

5.4.3 - Conceptualisation and Operationalisation of Mechanism Condition 3: Ability to Acquire Modern Family Planning Methods

This section examines theory and concepts, operationalisation and the logical engineering for Mechanism Condition 3: Ability to Acquire Modern Family Planning Methods.

Ability

Market costs of fertility regulation include the time and money required to learn about and use specific methods (Easterlin 1975:56). Additionally, the notion of Ability within the RWA framework refers to the accessibility of contraceptive methods, with difficulties in access acting to increase costs and thus reduce Ability (Lesthaeghe & Vanderhoeft 2001:241; see also Palloni 2001:106).

Lesthaeghe & Vanderhoeft (2001:258) in their employment of the RWA framework to the analysis of fertility in African countries include knowledge of contraceptive methods, knowledge of family planning services, difficulty of access to contraception and price costs in their treatment of Ability. Knowledge of modern contraceptive methods (which could also be allied to knowledge of family planning services) in this study is considered more appropriately classified, for reasons already discussed, as a constituent aspect of Condition 2: Willingness to Limit Fertility and Use Modern Family Planning Methods. Therefore with regards to Ability to Acquire Modern Family Planning Methods, the logistical ease of acquisition and the subjective monetary costs for the main method currently used and for any most-preferred method not currently used is considered an appropriate treatment. Incorporation of indicators for most-preferred method not currently used aims to confirm whether logistical ease of acquisition and subjective monetary costs are relevant to which method is actually used – the presence of a most-preferred method not currently used should be indicated by relatively less logistical ease of acquisition and/or higher subjective monetary costs when compared to the main method currently used.

Pre-Examination Operationalisation of Mechanism Condition 3: Ability to Acquire Modern Family Planning Methods

Although the life cycle period of relevancy for the Fertility Outcome is the childbearing phase, and the period after the last successful childbirth is relevant only to the avoidance of unwanted fertility, current usage and preferences are referred to in the operationalisation of Ability to Acquire Modern Family Planning Methods on the pragmatic basis that retrospective indicators would tend to yield less accurate data. Since respondents were selected on the basis that their youngest child was at least 5 years of age, and therefore that their childbearing phase had clearly concluded, current Ability to Acquire Modern Family Planning Methods is in essence verified to relate to the period spanning the last successful childbirth till the time of interview (no Wife respondents were in a state of known pregnancy at that time).

It appears reasonable to temporally infer that if the current Ability to Acquire Modern Family Planning Methods was relevant and effective from immediately after the last successful childbirth in the successful avoidance of further pregnancy, then Ability must have been very similar before the last childbirth as well. Since it is the last successful childbirth which establishes the value of the Fertility Outcome, current Ability to Acquire Modern family Planning Methods is thus temporally inferred to be relevant to the Fertility Outcome.

The Ability to Acquire Modern Family Planning Methods therefore incorporates, both for the main method currently used and any most-preferred method not currently used, indicators relating to the logistical ease of acquisition and subjective monetary costs.

Concept Logical Engineering Notes

The logical engineering process produced a post-examination operationalisation for Condition 3: Ability to Acquire Modern Family Planning Methods based entirely on the value of the indicator Ability to Acquire Main Method of Contraception Used, which in turn is based entirely on the subjective monetary cost of the main method currently used.

5.4.4 – Conceptualisation and Operationalisation of Dependent Outcome: Fertility Outcome

This section examines theory and concepts, operationalisation, case selection and the logical engineering for Dependent Outcome: Fertility Outcome.

Fertility Outcomes and Couple Types

Smith (1989:175) asserts that in a population experiencing fertility transition, declines in aggregate fertility to intermediate levels are not indicative of the temporary economic rationality of having an intermediate level of fertility, but rather can be viewed as resulting from shifts in the distribution of couples living under the old pre-transitional high fertility regime towards those living under the new post-transitional low fertility regime.

This understanding of fertility transition and the accompanying classification of couples into pre-transitional and post-transitional types accords with theories which similarly make a clear distinction between the pre-transitional and the post-transitional couple in terms of their situations, motivations, preferences, decisions and fertility outcomes, for example the wealth flows theory (see Caldwell 1976, 1978, 1982) and the children as security assets theory (see Cain 1978, 1981, 1982).

Other theories and models directed at fertility point more towards the couple's situations, motivations, preferences, decisions and fertility outcomes in a manner characterised by variation in terms of degree rather than distinctions based on type, for example marriage bargaining models (see Folbre 1983; Lundberg & Pollak 1993; Manser & Brown 1980; McElroy & Horney 1981), social norms theories (Blake 1968; Casterline 2001; Montgomery & Casterline 1996) and family planning models (Cleland et al. 1994), but also implicitly acknowledge or explicitly refer to pre-transitional and post-transitional classifications, albeit at the macro population level.

Regardless of whether theoretical constructs are based in types or in variation by degree, they can be examined in terms of presence and absence, high values and low values, and brought into analytical compatibility when conceptualisation and operationalisation proceeds on the basis of the analytical insignificance of

indeterminate or vague values situated between present and absent types and of intermediate or medium values situated between high values and low values. This allows theoretical constructs whether based in presence and absence or high values and low values to be classified according to types with clear cut distinctions resulting in their analytical compatibility.

Given that an overall TFR of 2.0 across Bangladesh is the HPNSDP 2011-16 target (MOHFW 2011b:189), and a TFR at this level has the unique status of being the replacement level of fertility, couples who have a Fertility Outcome of ≤ 2 living children can be considered to appropriately represent the post-transitional couple. Because most couples in Chittagong want a minimum of four children (Islam et al. 2010:706), couples with a Fertility Outcome of ≥ 4 living children can be considered to appropriately represent the pre-transitional couple.

Defining the pre-transitional and post-transitional couple in this manner also yields the important advantage of reducing the possibility of examining couples with a disjuncture between their Fertility Demand, the number of children they desired, and their actually realised Fertility Outcome: a Fertility Outcome of 3 living children can easily be achieved through a single unintended pregnancy by a couple who nevertheless have a low Fertility Demand of ≤ 2 living children, by a couple who specifically have a Fertility Demand of 3 living children, and by a couple who have a high Fertility Demand of ≥ 4 living children but happened to have one child less than desired.

Defining a couple's high Fertility Demand/Fertility Outcome as ≥ 4 living children provides a comfortable difference of at least 2 living children between a low Fertility Demand of ≤ 2 living children and a high Fertility Outcome of ≥ 4 living children, and between a high Fertility Demand of ≥ 4 living children and a low Fertility Outcome of ≤ 2 living children.

The distinctions between a high Fertility Demand (≥ 4 living children) and a low Fertility Demand (≤ 2 living children), and between a high Fertility Outcome (≥ 4 living children) and a low Fertility Outcome (≤ 2 living children) are clear, and the conceptualisation and operationalisation of Fertility Demand and Fertility Outcome in relation to one another is also clear cut and consistent.

An alternative possible definition of Fertility Outcome would examine the number of live births instead of the number of living children. The calculation of TFR is after all based on birth rates and does not take child mortality into account (see NIPORT et al. 2013:59-60). However, because the demand for children relates to living children, not live birth events, and because child mortality has the potential to instigate additional fertility for 'replacement' children in order to meet demand, defining the Fertility Outcome in terms of the number of living children appears more appropriate for the development of a conceptually compatible link between Husband's, Wife's and Couple's Fertility Demand and their Fertility Outcome.

Case Selection Notes

Case selection proceeded on the basis of the alignment of the values of selected exogenous conditions with values of Fertility Outcome.

Concept Logical Engineering Notes

Logical engineering proceeded as per the operationalisation detailed above, with the following table exhibiting the values assigned to Dependent Outcome: Fertility Outcome for each instance under examination.

5.4.5 - Model Level Summary

The table presents the logical engineering results for all the conditions of each case in relation to Model 4: Family Planning. It may be noted that although Dependent Outcome: Fertility Outcome is displayed in the table, it is a framework level outcome and not a model level outcome for Model 4: Family Planning. The two model level outcomes are Condition 2 as well as Condition 3.

Table 5.4 **Model 4: Family Planning, Logical Engineering Results**

Conditions:	**Case ID:**							
	44	**28**	**33**	**60**	**22**	**12**	**50**	**8**
Condition 1: Family Planning Programming & N.G.O Exposure High(1) Medium(--) Low(0)	1	1	1	1	--	--	0	0
Condition 2: Willingness to Limit Fertility and Use Modern Family Planning Methods High(1) Medium(--) Low(0)	0	--	--	1	--	1	--	--
Condition 3: Ability to Acquire Modern Family Planning Methods High(1) Medium(--) Low(0)	0	1	0	1	1	1	0	0
Dependent Outcome: Fertility Outcome Low(1) Medium(--) High(0)	0	1	0	1	0	1	0	1

Chapter 6. Analyses and Results

This chapter seeks to deliver the responses to the two research questions of this study:

Q1. What are the major determinants and underlying causal mechanisms of differing fertility outcomes within the urban poor of Chittagong?

Q2. How likely will family planning programmatic interventions succeed in reducing the fertility outcomes of the urban poor in Chittagong?

The chapter is accordingly organised into two parts focused on the development and delivery of the response to each question.

The response to the first question is developed and delivered first, and proceeds in four steps: first, the 'stage one' analysis of each separate model in the RWA framework proceeds using the output produced in the previous chapter to identify which cases and which conditions of these cases at model level are relevant for further analysis; second, the 'stage two' analysis brings the output of stage one for each separate model together in order to conduct an analysis at the level of the RWA framework and thereby develop the causal explanation of the study; third, the 'stage three' analysis is conducted to assess the relevancy of the causal explanation thus developed from the small-N investigation to the wider population of interest; finally, the response to the first research question of the study is presented.

The response to the second question is then developed and delivered in six steps: first, there is an examination of the current family planning programme's aims and priorities; second, a comparison is conducted between the family planning programme theory and Social Norms explanation to highlight their differing positions; third, an examination of behavioural trends in the general population of Bangladesh is conducted with a view to obtaining a suggestive arbitration as to the relative relevancy of the two positions in relation to the population of interest; fourth, there is an examination of the background and the rationale underlying the formulation of the current family planning programme theory; fifth, the response to the second research question of the study is presented; and finally, recommendations are put forward.

6.1 - Developing and Delivering the Response to the First Research Question

The first question of the study is: What are the major determinants and underlying causal mechanisms of differing fertility outcomes within the urban poor of Chittagong?

The development and delivery of the response to the first research question is organised into four steps or stages.

Stage one analysis brings together the values assigned to the conditions for each case and organises the cases and their conditions by model. The purpose of this stage, based on the alignment of the condition values exhibited by each case with regards to the hypotheses for each particular model, is to identify which cases and which conditions of these cases for each particular model are relevant for further analysis and can therefore be carried forward to the second stage of analysis.

Stage two analysis brings together all the separate models with their remaining relevant cases, and these cases with their remaining relevant conditions, for an analysis at the level of the RWA framework in order to identify the most plausible causal explanation for differing fertility outcomes within the couples examined in the small-N investigation.

Stage three analysis assesses the relevancy of the developed causal explanation to the population of interest through the examination of the explanation's observable implications for couples in secondary data who are matched in similarity to those particular couples in the small-N investigation from whom the causal explanation is developed.

The final section then presents the results of the analyses as the response to the first research question of this study.

6.1.1 - Stage One Analysis

In stage one, the key criteria used to carry forward a case with each model for further analysis in stage two is whether there is a hypothesis-compliant unbroken sequence of conditions attached to the immediate outcome of the model. Any hypothesis-compliant sequences of conditions that stretch back in the direction of the more distal conditions from the immediate outcome of the model allow the case in which they are exhibited to be sent forward with the unbroken sequence of conditions attached, but discarding the rest, to the next stage for that particular model.

The elimination of particular conditions across all cases in the model occurs if an otherwise hypothesis-compliant sequence is found to have an opposite valued condition between two compliant conditions. This renders all the conditions preceding the opposite valued condition in the sequence eliminated as possible causal conditions for that sequence leading up to the immediate outcome for all the cases under examination in the model, regardless of their own value for this particular sequence of conditions.

So if for example there is the hypothesised sequence ABCDE leading to immediate outcome Y, and it is found that in one case, whilst ABDE exhibit the hypothesis-compliant values, for example respective values of (1,1,1,1), condition C exhibits the opposite value, in this example (0), then the distal conditions AB are discarded from further analysis across all the cases, whilst condition C would not be carried forward with the case because its value (0) is not hypothesis-compliant, but DE exhibiting respective values of (1,1) would be carried forward with the case since these conditions might still be causally relevant to the production of Y with a value of (1).

Stage one analysis is conducted for each model in the format first of providing a diagrammatic overview of the model and stating the hypotheses, then conducting the analysis in tabular form, and finally presenting the result diagrammatically.

It may be noted that in tables and diagrams, a case ID with a prefix of W indicates the Wife, H indicates the Husband and C indicates the Couple.

The analysis in the tables makes use of three symbols:

1) The symbol ✓ indicates which conditions in sequence are hypothesis-compliant and will be carried forward with the case to stage two analysis.

2) The symbol ↓ represents the hypothesis term 'tends to produce' for the respective condition values of (1) and separately of (0) for each case, and indicates the hypothesised direction of causation between the conditions exhibited in the tables.

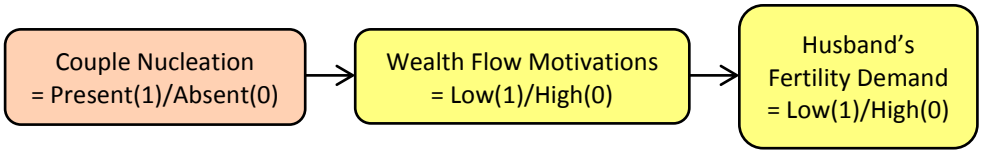
3) The symbol × is used to indicate the immediate condition that is eliminated for all the cases under examination for the particular model (to avoid clutter the symbol is not used to indicate the more distal conditions that are also eliminated as a consequence), and is placed on the specific condition of the particular case due to which such elimination occurs, in order to allow the reader quick identification of the offending case and the sequence exhibiting the opposite valued condition between two compliant conditions.

The diagrammatic results of the analyses for each model indicate which positive and negative cases, and which of their conditions, are to be carried forward with them to stage two analysis. In these result diagrams, the dashed lines indicate which particular conditions are to be carried forward with each particular case to be carried forward.

Models 1, 2, 3 and 4 are now analysed, with the two separate casual chains that constitute Model 3 analysed separately.

Model 1: Wealth Flows

Figure 6.1 Model 1: Wealth Flows



Hypotheses[77]

Positive Instances:

1) Couple Nucleation = Present(1)
   tends to produce
   Wealth Flow Motivations = Low(1)

2) Wealth Flow Motivations = Low(1)
   tends to produce
   Husband's Fertility Demand = Low(1)

Negative Instances:

1) Couple Nucleation = Absent(0)
   tends to produce
   Wealth Flow Motivations = High(0)

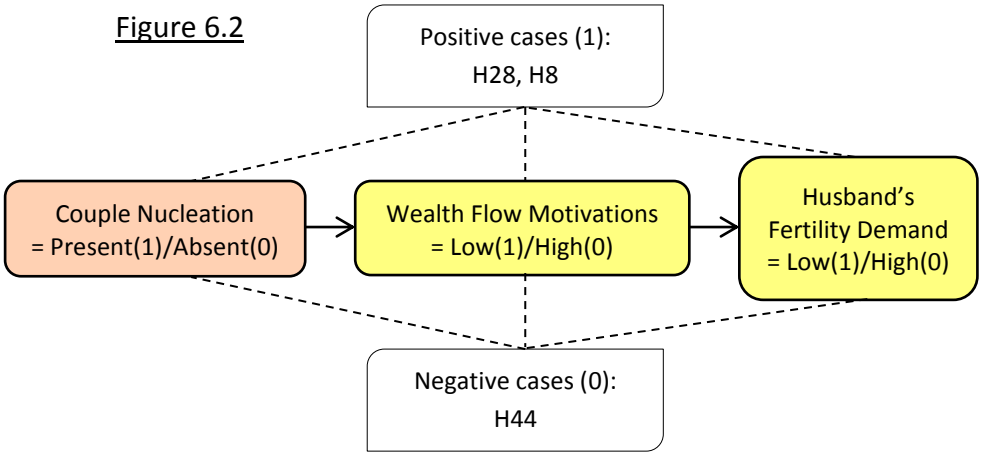
2) Wealth Flow Motivations = High(0)
   tends to produce
   Husband's Fertility Demand = High(0)

[77] It may be recalled that the originally specified model also had Religiosity as a condition, but meaningful operationalisation was not possible. Details are provided in the concept logical engineering notes for the condition Religiosity of Model 1: Wealth Flows in Chapter 5.

Table 6.1	Stage One Analysis of Model 1: Wealth Flows							
Conditions:	**Case ID:**							
	H44	**H28**	**H33**	**H60**	**H22**	**H12**	**H50**	**H8**
Exogenous Condition 1: Couple Nucleation Present(1) Partial(--) Absent(0)	0 ✓	1 ✓	--	--	--	0	--	1 ✓
↓								
Mechanism Condition 3: Wealth Flow Motivations Low(1) Indeterminate(--) High(0)	0 ✓	1 ✓	--	--	0	--	1	1 ✓
↓								
Condition 4/Outcome 1H: Husband's Fertility Demand Low(1) Medium(--) High(0)	0 ✓	1 ✓	0	1	1	1	0	1 ✓
Analytical Result: Cases to carry forward (CF)	CF	CF						CF

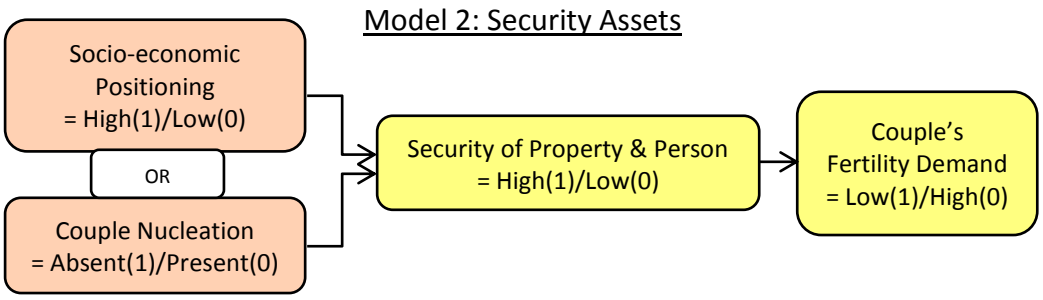
Model 1 Result Diagram

Figure 6.2



Model 2: Security Assets

Figure 6.3



Hypotheses

Positive Instances:

1) Socio-economic Positioning = High(1) OR Couple Nucleation = Absent(1)
   tends to produce
   Security of Property & Person = High(1)

2) Security of Property & Person = High(1)
   tends to produce
   Couple's Fertility Demand = Low(1)

Negative Instances:

1) Socio-economic Positioning = Low(0) OR Couple Nucleation = Present(0)
   tends to produce
   Security of Property & Person = Low(0)

2) Security of Property & Person = Low(0)
   tends to produce
   Couple's Fertility Demand = High(0)

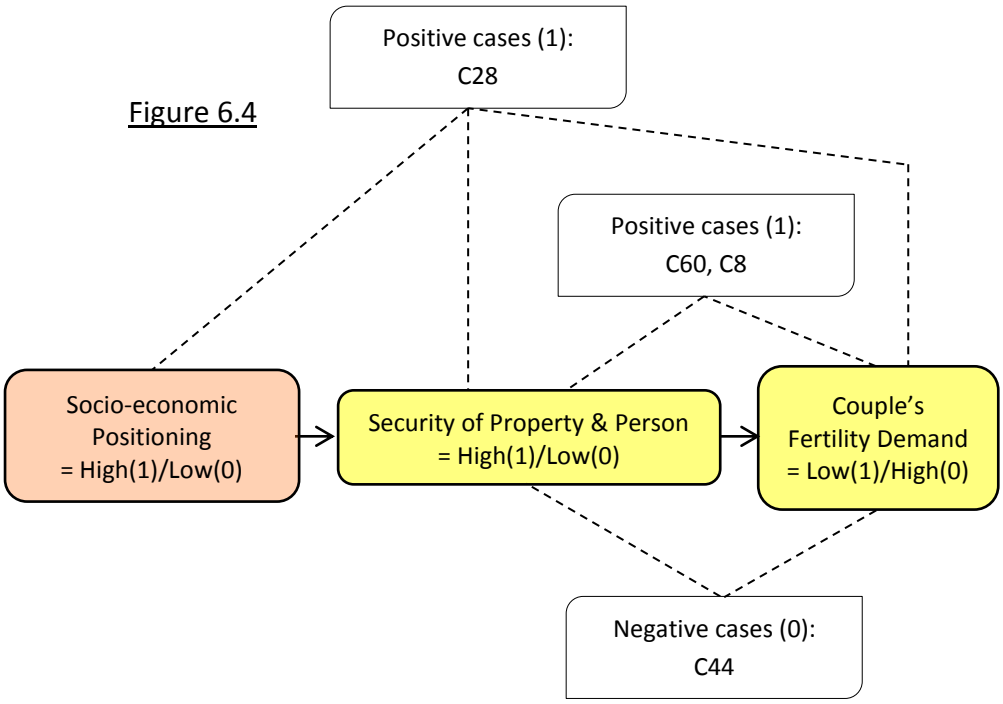
Table 6.2	**Stage One Analysis of Model 2: Security Assets**							
Conditions:	**Case ID:**							
	C44	**C28**	**C33**	**C60**	**C22**	**C12**	**C50**	**C8**
Exogenous Condition 1: Socio-economic Positioning High(1) Medium(--) Low(0)	--	1 ✓	0	--	--	0	1	--
Logical Operator: OR								
Exogenous Condition 2: Couple Nucleation Absent(1) Partial(--) Present(0)	1	0	--	--	--	1 ×	--	0
↓ (applicable to conditions 1 OR 2)	*Condition 2 eliminated due to condition values of C12*							
Mechanism Condition 3: Security of Property and Person High(1) Low(0)	0 ✓	1 ✓	0	1 ✓	0	0	0	1 ✓
↓								
Condition 4/Outcome 1C: Couple's Fertility Demand Low(1) Medium(--) High(0)	0 ✓	1 ✓	--	1 ✓	--	1	--	1 ✓
Analytical Result: Cases to carry forward (CF)	CF	CF		CF				CF

Notes:

Due to the eliminatory implication of the values of Conditions 2(1), 3(0) and 4(1) of C12, Condition 2 is eliminated as a possible causal condition for all cases under examination in Model 2: Security Assets.

Model 2 Result Diagram

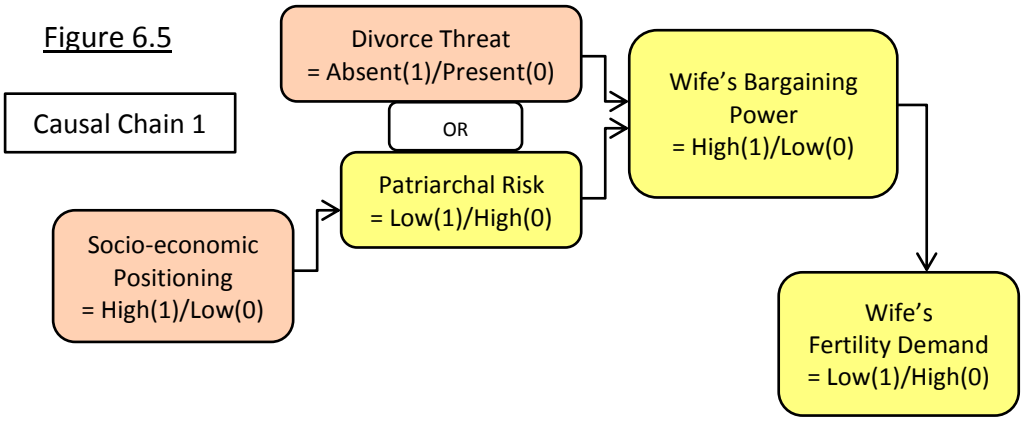
Figure 6.4



Model 3: Bargaining and Social Norms
Causal Chain 1: Bargaining

Model 3, Causal Chain 1: Bargaining

Figure 6.5



Hypotheses

Positive Instances:

1) Socio-economic Positioning = High(1)
   tends to produce
   Patriarchal Risk = Low(1)

2) Patriarchal Risk = Low(1) OR Divorce Threat = Absent(1)
   tends to produce
   Wife's Bargaining Power = High(1)

3) Wife's Bargaining Power = High(1)
   tends to produce
   Wife's Fertility Demand = Low(1)

Negative Instances:

1) Socio-economic Positioning = Low(0)
   tends to produce
   Patriarchal Risk = High(0)

2) Patriarchal Risk = High(0) OR Divorce Threat = Present(0)
   tends to produce
   Wife's Bargaining Power = Low(0)

3) Wife's Bargaining Power = Low(0)
   tends to produce
   Wife's Fertility Demand = High(0)

The stage one analysis table for Model 3: Bargaining and Social Norms, Causal Chain 1: Bargaining is displayed on the following page.

Table 6.3	**Stage One Analysis of Model 3, Causal Chain 1: Bargaining**							
Conditions:	**Case ID:**							
	W44	**W28**	**W33**	**W60**	**W22**	**W12**	**W50**	**W8**
Exogenous Condition 1: Socio-economic Positioning High(1) Medium(--) Low(0)	--	1	0	--	--	0	1	--
↓	*Condition 1 eliminated due to Condition 3 elimination*							
Mechanism Condition 3: Patriarchal Risk Low(1) Medium(--) High(0)	--	1 ×	--	1	0	--	0	0
Logical Operator: OR	*Condition 3 eliminated due to condition values of W28*							
Exogenous Condition 2: Divorce Threat Absent(1) Present(0)	0	0	0	0	1	1	1 ×	1
↓ (applicable to conditions 3 OR 2)	*Condition 2 eliminated due to condition values of W50*							
Mechanism Condition 4: Wife's Bargaining Power High(1) Medium(--) Low(0)	0 ✓	0	0	1 ✓	0	1 ✓	0	1 ✓
↓								
Condition 6/Outcome 1W: Wife's Fertility Demand Low(1) Medium(--) High(0)	0 ✓	1	1	1 ✓	--	1 ✓	1	1 ✓
Analytical Result: Cases to carry forward (CF)	CF			CF		CF		CF

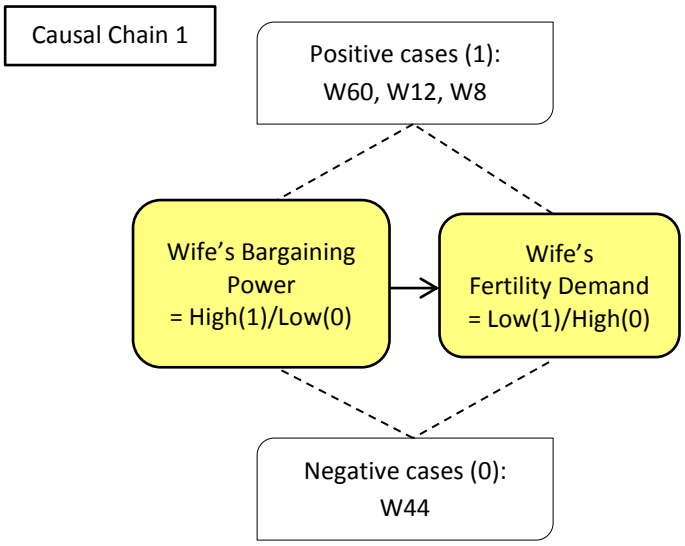
Notes:

Due to the eliminatory implication of the values of Conditions 3(1), 4(0) and 6(1) of W28, Condition 3: Patriarchal Risk is eliminated as a possible causal condition for all cases under examination in Model 3: Bargaining and Social Norms (logicians may note that even though Condition 2(0) aligns with Condition 4(0) in W28 it is irrelevant because the elimination of Condition 3 occurs by consideration of the entire sequence 3(1), 4(0) and 6(1)). Similarly, due to the eliminatory implication of the values of Conditions 2(1), 4(0) and 6(1) of W50, Condition 2 is eliminated as a possible causal condition for all cases under examination in Model 3: Bargaining and Social Norms.

Condition 1: Socio-economic Positioning as the hypothesised causal predecessor of eliminated Condition 3: Patriarchal Risk in Causal Chain 1 is also eliminated, but only for Causal Chain 1, and remains a possible causal condition for Causal Chain 2 in Model 3: Bargaining and Social Norms.

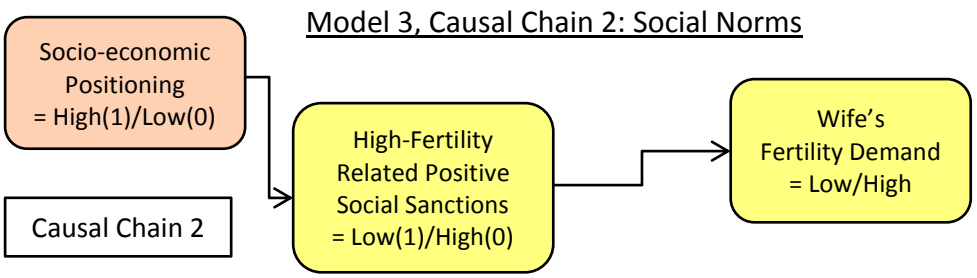
Model 3, Causal Chain 1 Result Diagram

Figure 6.6



Model 3: Bargaining and Social Norms
Causal Chain 2: Social Norms

Figure 6.7



Hypotheses

Positive Instances:

1) Socio-economic Positioning = High(1)
   tends to produce
   High-Fertility Related Positive Social Sanctions = Low(1)

2) High-Fertility Related Positive Social Sanctions = Low(1)
   tends to produce
   Wife's Fertility Demand = Low(1)

Negative Instances:

1) Socio-economic Positioning = Low(0)
   tends to produce
   High-Fertility Related Positive Social Sanctions = High(0)

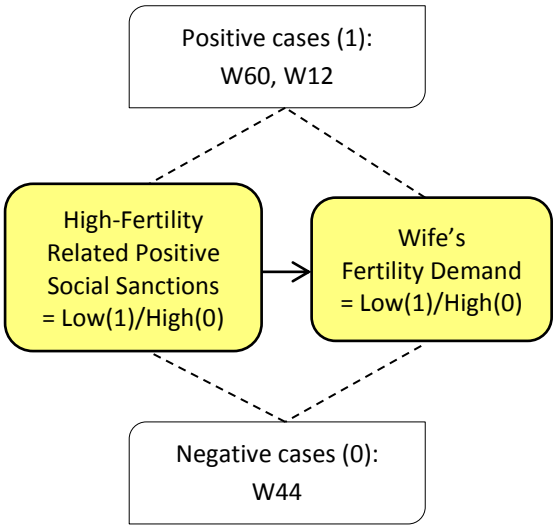
2) High-Fertility Related Positive Social Sanctions = High(0)
   tends to produce
   Wife's Fertility Demand = High(0)

Table 6.4	Stage One Analysis of Model 3, Causal Chain 2: Social Norms							
Conditions:	**Case ID:**							
	W44	**W28**	**W33**	**W60**	**W22**	**W12**	**W50**	**W8**
Exogenous Condition 1: Socio-economic Positioning High(1) Medium(--) Low(0)	--	1	0	--	--	0	1	--
↓								
Mechanism Condition 5: High-Fertility Positive Social Sanctions at Start Low(1) Medium(--) High(0)	0 ✓	--	--	1 ✓	--	1 ✓	--	--
↓								
Condition 6/Outcome 1W: Wife's Fertility Demand Low(1) Medium(--) High(0)	0 ✓	1	1	1 ✓	--	1 ✓	1	1
Analytical Result: Cases to carry forward (CF)	CF			CF		CF		

Model 3, Causal Chain 2 Result Diagram

Figure 6.8

Causal Chain 2



Model 4: Family Planning

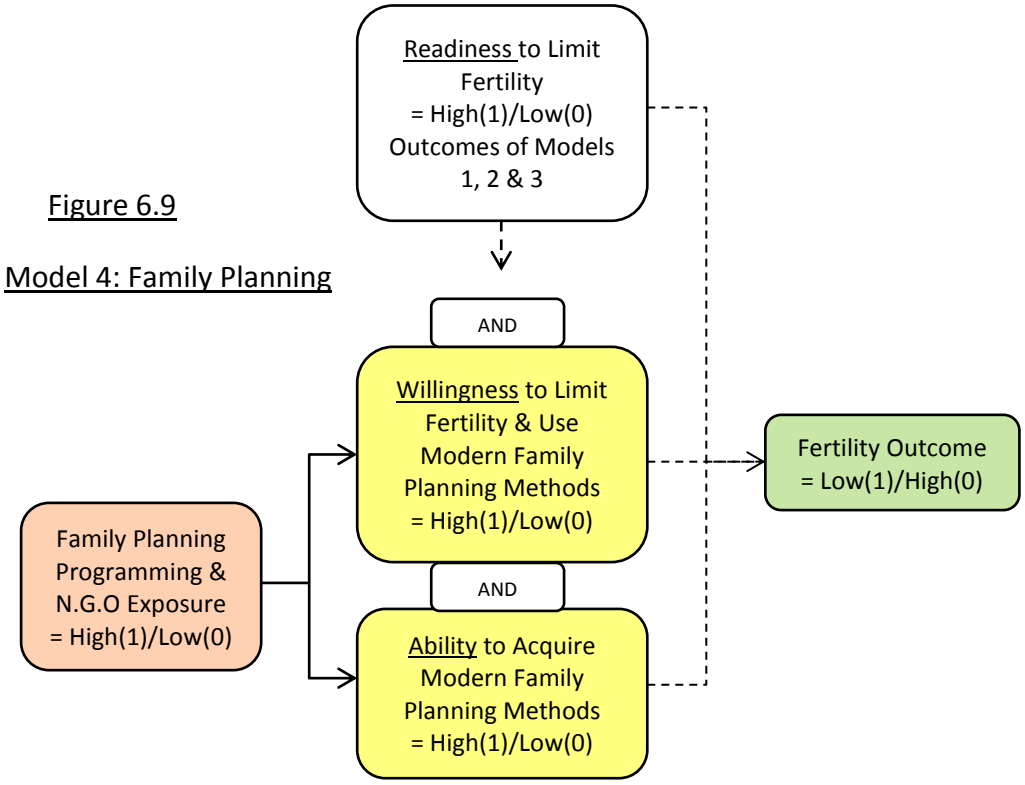


Figure 6.9

Model 4: Family Planning

Note: dashed arrows indicate framework level hypotheses

Hypotheses

Positive Instances:

1) Family Planning Programming & N.G.O Exposure = High(1)
   tends to produce
   Willingness to Limit Fertility & Use Modern Family Planning Methods = High(1)
   AND Ability to Acquire Modern Family Planning Methods = High(1)

Negative Instances:

2) Family Planning Programming & N.G.O Exposure = Low(0)
   tends to produce
   Willingness to Limit Fertility & Use Modern Family Planning Methods = Low(0)
   AND Ability to Acquire Modern Family Planning Methods = Low(0)

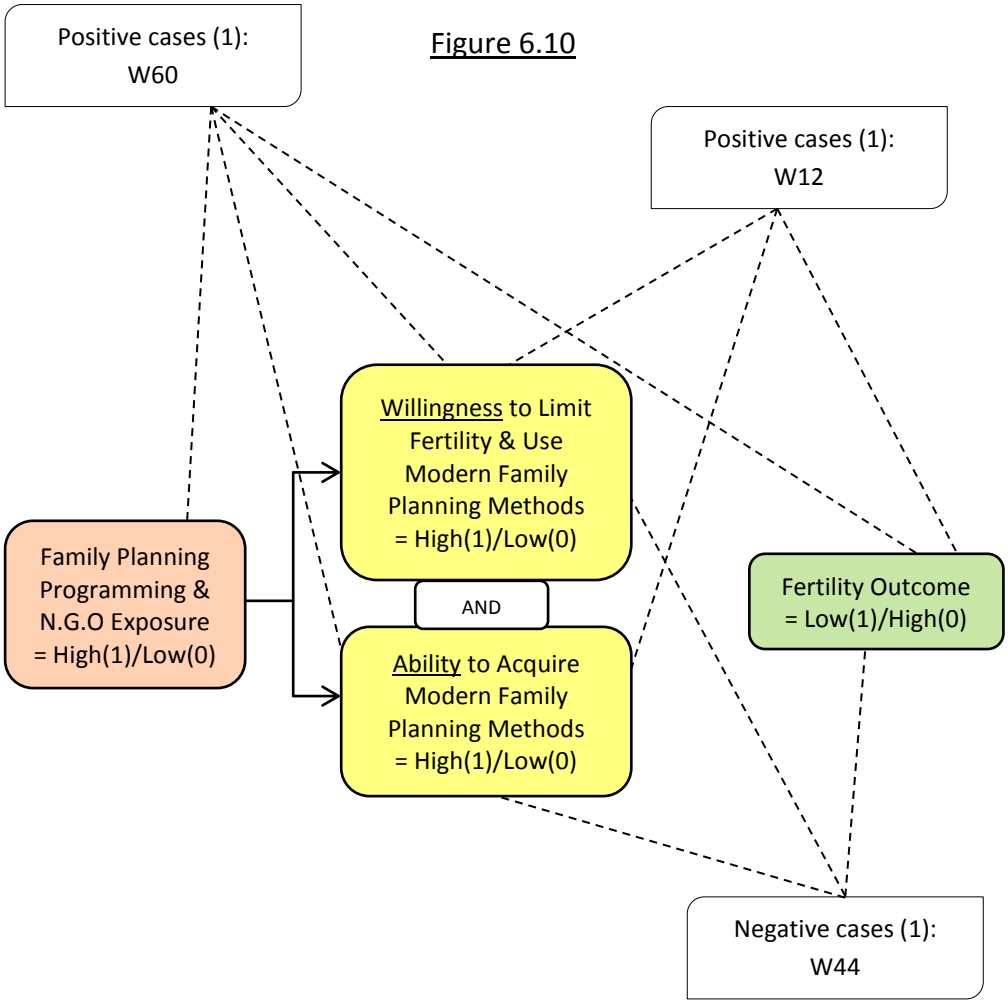
Table 6.5	**Stage One Analysis of Model 4: Family Planning**							
Conditions:	**Case ID:**							
	W44	**W28**	**W33**	**W60**	**W22**	**W12**	**W50**	**W8**
Exogenous Condition 1: Family Planning Programming & N.G.O Exposure High(1) Medium(--) Low(0)	1 ✓	1	1	1	--	--	0	0
↓ Cnd. 1 produces both Cnd. 2 & 3								
Mechanism Condition 2: Willingness to Limit Fertility and Use Modern Family Planning Methods High(1) Medium(--) Low(0)	0 ✓	--	--	1 ✓	--	1 ✓	--	--
Logical Operator: AND								
Mechanism Condition 3: Ability to Acquire Modern Family Planning Methods High(1) Medium(--) Low(0)	0 ✓	1	0	1 ✓	1	1 ✓	0	0
Readiness required with Cnd. 2 & 3 for ↓								
Dependent Outcome: Fertility Outcome Low(1) Medium(--) High(0)	0 ✓	1	0	1 ✓	0	1 ✓	0	1
Analytical Result: Cases to carry forward (CF)	CF			CF		CF		

Notes:

Although the values of Condition 3: Ability to Acquire Modern Family Planning Methods and the Dependent Outcome: Fertility Outcome are in alignment for W28 (1,1), W33 (0,0) and W50 (0,0), these cases cannot be carried forward because the Logical Operator AND requires additionally the alignment of values for Condition 2: Willingness to Limit Fertility and Use Modern Family Planning Methods, which is not the situation for these cases.

Model 4 Result Diagram

Figure 6.10



Note: the causal arrows to Fertility Outcome are not incorporated because the framework level condition of Readiness is additionally required to produce the Fertility Outcome.

6.1.2 - Stage Two Analysis

Having analysed each model in isolation from each other, the analysis now proceeds using the output produced to the next stage of the analysis in which the cases and models are analysed at the level of the framework.

The first stage of analysis examined each model in isolation from each other in order to identify which particular cases, and which conditions of these cases, are relevant for inclusion in this next stage of the analysis. Those cases which exhibited hypothesis-compliant condition values (both positive and negative) in sequence attached to the immediate outcome within each separate model were marked as 'carried forward'. This output in the form of the cases and their relevant conditions is now brought together and analysed.

The objective of this stage of the analysis is to develop one or more plausible causal explanations spanning an entire causal chain constituted by the major determinant/s and underlying causal mechanisms leading to the ultimate outcome of the framework, the Fertility Outcome.

Stage two analysis therefore involves a number of procedural steps: first, out of the cases carried forward with each model from the stage one analysis, those cases which are relevant for the development of a causal explanation at the level of the framework are identified; second, the models which are relevant for an explanation at the level of the framework are identified; third, the plausibility and generality of the explanations offered by these relevant models is increased; fourth, an arbitration between remaining rival explanations is conducted through plausibility testing; fifth, the plausibility of the remaining causal explanation is maximised by the use of model adjustment; finally, the resulting causal explanation is examined in detail with reference to the specific operationalisation of each condition in the explanation and how these conditions in light of this detail relate to one another as a causal chain with a view to informing the next key stage of analysis, stage three, which assesses the relevancy of the causal explanation to the population of interest.

These stage two analysis steps are now undertaken.

Identification of the Relevant Cases in Each Model for Causal Explanation

The analysis of Model 4: Family Planning in the first stage of the analysis identified three particular cases to carry forward to this stage, W44, W60 and W12. Model 4 is constituted by the Willingness AND Ability conditions of the causal chain when viewed at from the level of the framework. Readiness derived from the analysis of Models 1, 2 and 3 also has to combine with Willingness in Model 4 in the form Readiness AND Willingness.

As such the combination of Readiness (from Models 1, 2 and 3) AND Willingness AND Ability (from Model 4) across the framework effectively means that only those cases carried forward for Model 4, W44, W60 and W12, are relevant to the analysis of the entire causal chain – the analysis of any other cases is incapable of producing a causal explanation that spans to the ultimate outcome of the framework, Fertility Outcome. This first procedure therefore uses a table to identify these particular cases within the context of the different models. The two separate causal chains that constitute Model 3: Bargaining and Social Norms are analysed separately.

The table is presented on the next page.

Table 6.6	**Identification of the relevant cases in each model for causal explanation at the framework level**							
Framework Level: Readiness	**Case ID:**							
Model 1: Wealth Flows	H44	H28	H33	H60	H22	H12	H50	H8
Exogenous Condition 1: Couple Nucleation	0	1						1
Mechanism Condition 3: Wealth Flow Motivations	0	1						1
Condition 4/Outcome 1H: Husband's Fertility Demand	0	1						1
Analytical Result: Cases for framework level analysis: case ID	H44							
	Case ID:							
Model 2: Security Assets	C44	C28	C33	C60	C22	C12	C50	C8
Exogenous Condition 1: Socio-economic Positioning		1						
Mechanism Condition 3: Security of Property and Person	0	1		1				1
Condition 4/Outcome 1C: Couple's Fertility Demand	0	1		1				1
Analytical Result: Cases for framework level analysis: case ID	C44			C60				
	Case ID:							
Model 3: Bargaining and Social Norms Causal Chain 1: Bargaining	W44	W28	W33	W60	W22	W12	W50	W8
Mechanism Condition 4: Wife's Bargaining Power at Start	0			1		1		1
Condition 6/Outcome 1W: Wife's Fertility Demand	0			1		1		1
Analytical Result: Cases for framework level analysis: case ID	W44			W60		W12		
	Case ID:							
Model 3: Bargaining and Social Norms Causal Chain 2: Social Norms	W44	W28	W33	W60	W22	W12	W50	W8
Mechanism Condition 5: High-Fertility Positive Social Sanctions at Start	0			1		1		
Condition 6/Outcome 1W: Wife's Fertility Demand	0			1		1		
Analytical Result: Cases for framework level analysis: case ID	W44			W60		W12		
Framework Level: Willingess and Ability	**Case ID:**							
Model 4: Family Planning	W44	W28	W33	W60	W22	W12	W50	W8
Exogenous Condition 1: Family Planning Programming & N.G.O Exposure				1				
Mechanism Condition 2: Willingness to Limit Fertility and Use Modern Family Planning Methods	0			1		1		
Mechanism Condition 3: Ability to Acquire Modern Family Planning Methods	0			1		1		
Dependent Outcome: Fertility Outcome	0			1		1		
Analytical Result: Cases for framework level analysis: case ID	W44			W60		W12		

Identification of the Relevant Models for Causal Explanation

Having identified the relevant cases across each separate model for analysis at the level of the framework, this next procedure seeks to eliminate those models from consideration for which there are relatively few remaining cases, provided the model subject to elimination on this basis is not the only model applicable to a particular case at the level of the couple. Couple 44 presents an interesting case because either H44, W44 or C44 are present in all the models, including the two separate hypothesised causal chains of Model 3. However H44 is the sole case relevant to Model 1: Wealth Flows. There is no manner of avoiding the possibility that the *actual* causal explanation for the Fertility Outcome of Couple 44 might rest in Model 1, and that the alternative causal explanations offered for their Fertility Outcome by other models (which relate to additional cases as well) are actually irrelevant to this particular couple. However, in the step by step processes during this second stage of the analysis of moving away from individual case-level explanations towards those which offer a higher level of generality applicable to all the relevant cases remaining under examination, this step has to be undertaken. Therefore, as with the elimination of Model 1, Model 2 is also removed from further consideration because only two cases, C44 and C60, are relevant. As a result, the models which are retained for analysis at the level of the framework are the two Causal Chains 1 and 2 in Model 3: Bargaining and Social Norms and Model 4: Family Planning as indicated in the table below.

Table 6.7	**Identification of the relevant models for causal explanation**		
Readiness	**Case ID:**		
Model 1: Wealth Flows	H44		
Model 2: Security Assets	C44	C60	
Model 3: Bargaining and Social Norms Causal Chain 1: Bargaining	W44	W60	W12
Model 3: Bargaining and Social Norms Causal Chain 2: Social Norms	W44	W60	W12
Willingess and Ability	**Case ID:**		
Model 4: Family Planning	W44	W60	W12
Analytical Result: Models retained: Model 3: Bargaining and Social Norms, Causal Chain 1: Bargaining Model 3: Bargaining and Social Norms, Causal Chain 2: Social Norms Model 4: Family Planning			

Increasing the Plausibility and Level of Generality of the Relevant Causal Explanations

Having eliminated the models with relatively lower applicability for the cases under consideration, the process of increasing the plausibility of the remaining causal explanations involves the elimination of conditions that impinge on the plausibility of explanation for all the remaining cases under consideration when viewed together. As such, the resulting explanations also become less case-specific and more generalised.

In Model 4: Family Planning, only W60 out of the three cases exhibits a hypothesis-compliant value (1) for Condition 1: Family Planning Programming & N.G.O Exposure. Yet W44 and W12 who do not exhibit a value for Condition 1 both exhibit respective hypothesis-compliant condition values for consequent conditions on the hypothesised causal chain - Condition 2: Willingness to Limit Fertility and Use Modern Family Planning Methods as well as Condition 3: Ability to Acquire Modern Family Planning Methods. Given that Condition 2: Willingness is conceptually determined by the Group Fertility Outcome Norm and Condition 3: Ability by the Subjective Expense of Mostly Used Method, the difficulty in providing a reason as to why Condition 1 might have been causally relevant for W60, even though for W12 it was not, whilst both cases exhibit the same values (1) for hypothesised consequent Conditions 2 and 3 renders the continued retention of Condition 1 disadvantageous to plausibility of explanation. It is therefore removed.

Table 6.8 **Increasing the plausibility and level of generality of the relevant causal explanations**

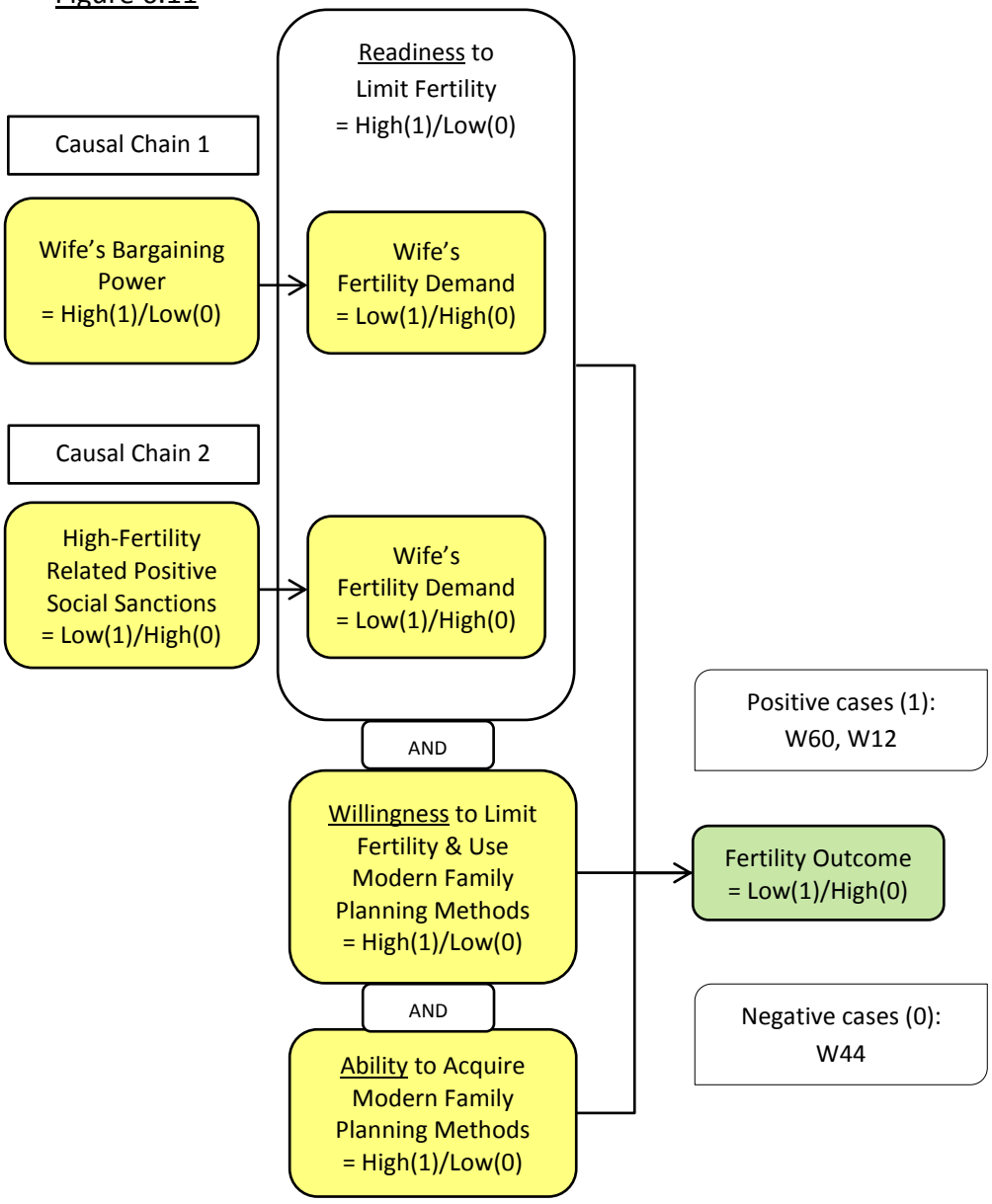
Willingess and Ability	**Case ID:**		
Model 4: Family Planning	W44	W60	W12
Exogenous Condition 1: Family Planning Programming & N.G.O Exposure		1	
Mechanism Condition 2: Willingness to Limit Fertility and Use Modern Family Planning Methods	0	1	1
Mechanism Condition 3: Ability to Acquire Modern Family Planning Methods	0	1	1
Dependent Outcome: Fertility Outcome	0	1	1
Analytical Result: Remove Exogenous Condition 1: Family Planning Programming & N.G.O Exposure from further analysis.		Remove Condition 1	

Arbitrating Between Remaining Rival Causal Explanations Through Plausibility Testing

The two remaining rival explanations initiate with the two different causal chains from Model 3: Bargaining and Social Norms - Causal Chain 1: Bargaining and Causal Chain 2: Social Norms. Both (sub) models relate to the formulation of Wife's Fertility Demand constituting the Readiness to Limit Fertility. Readiness AND Willingness AND Ability then combine to produce the Fertility Outcome. An arbitration is required between Causal Chain 1 and Causal Chain 2.

Arbitrating Between Rival Explanations

Figure 6.11



During the concept logical engineering process previously undertaken for each condition in chapter 5, each condition's post-examination operationalisation within a particular model occurs in isolation from one another. Furthermore, each model undergoes the process in isolation from one another. In this next procedure of the framework level analysis, the coherence, consistency and plausibility of the causal explanation provided by each remaining model undergoing arbitration is assessed across the entire causal chain that spans the framework, that is, in relation to other models which attach. Additionally, other conditions (specified in other models not qualifying for analysis at the level of the framework) attached to the relevant cases under consideration, W44, W60 and W12, can be brought in to aid this assessment if these conditions hold the potential to provide contradiction or support for the models under arbitration. The conditions Husband's Fertility Demand specified in Model 1: Wealth Flows and Couple's Fertility Demand specified in Model 2: Security Assets are brought in to aid plausibility testing. Causal Chain 1: Bargaining is examined first in this regard.

Given that Wife's Bargaining Power = High(1)/Low(0) is hypothesised to result in Wife's Fertility Demand = Low(1)/High(0) on the basis that women latently desire a lower number of children than men due to the disproportionate costs of child-bearing and child-rearing that women are subject to, the immediate plausibility test that comes to mind is a comparison of Wife's Fertility Demand against Husband's Fertility Demand and possibly Couple's Fertility Demand for each relevant couple. After all, if women inherently want fewer children than men then at least for those couples where Wife's Fertility Demand = Low(1), finding Husband's Fertility Demand not to be Low(1) would appear to support Causal Chain 1: Bargaining. However, Causal Chain 1: Bargaining is premised on the notion that Wife's Bargaining Power = High(1) allows the Wife to express her latent desire for fewer children as Wife's Fertility Demand = Low(1), whereas Wife's Bargaining Power = Low(0) prevents this, and instead produces a compromised and Husband-compliant Wife's Fertility Demand = High(0). There is no plausible reason to assume that a similarly compromised and Wife-compliant adjustment of Husband's Fertility Demand does not occur when Wife's Bargaining Power = High(1). Whilst this statement might initially appear questionable on the grounds of patriarchal context, it might be recalled that Condition 3: Patriarchal Risk in

hypothesised Causal Chain 1: Bargaining was previously, in the stage one analysis, eliminated as a causally relevant condition for all cases under examination in Causal Chain 1, and it was this eliminated condition that specifically aimed to capture the essence of the gendered context that would be required to cast doubt on the possibility of such Wife-compliant adjustments in Husband's Fertility Demand. A comparison of Wife's Fertility Demand against that of Husband's Fertility Demand or Couple's Fertility Demand for the relevant couples therefore appears to offer little promise for the assessment of Causal Chain 1: Bargaining.

Where Causal Chain 1: Bargaining does run into problems is when it attaches to Model 4: Family Planning. In Causal Chain 1: Bargaining, Wife's Fertility Demand (and therefore Readiness) is in conceptual essence based on her individual calculation and assertion of self-interest within the unit of the couple, with her ability to secure compromise from the Husband depending on the value of the condition Wife's Bargaining Power. However, the condition Willingness in Model 4: Family Planning which is to attach to Readiness is entirely based in concept on the Group Fertility Outcome Norm, that is, on the fertility outcomes that 2 out of 3 of the Wife's emotionally-closest-to married women friends or married women relatives have. The combination of Readiness as constituted by Wife's Fertility Demand based on the assertion of self-interest within the unit of the couple AND Willingness based on the Group Fertility Outcome Norm is highly questionable and incoherent as a combined causal explanation. It might be that women tend to establish emotional ties with women of similar Wife's Bargaining Power and this results in similar fertility outcomes in the group, but this would be a defence of Causal Chain 1: Bargaining based entirely on conjecture. For this reason, Causal Chain 1: Bargaining is eliminated from further analysis on the grounds of failing the plausibility test.

With regards to Causal Chain 2: Social Norms, Condition 6/Outcome 1W: Wife's Fertility Demand is preceded on the causal chain by Condition 5: High-Fertility Related Positive Social Sanctions which is conceptually based on the congruence of the Wife's and Husband's individual perceptions of the social respect to be generally gained by couples based on the number and sex composition of children. Bearing in mind the discussion above on Willingness, with its conceptual base in Group Fertility Outcome Norm, it is hard to imagine a more coherent and plausible conceptual basis for the

attachment of Readiness in Causal Chain 2: Social Norms AND Willingness in Model 4: Family Planning.

Causal Chain 2: Social Norms therefore passes the plausibility test and is thereby rendered the remaining explanation for major determinants and causal mechanisms leading to Readiness. The combination of Causal Chain 2: Social Norms and Model 4: Family Planning together therefore provides the remaining causal explanation spanning the framework from major determinants through the relevant underlying causal mechanisms to the Fertility Outcome.

Maximising Plausibility of the Remaining Causal Explanation by Model Adjustment

Given that plausibility tests proceed on the basis of assessing the coherence, consistency and plausibility of causal explanations across the causal chain of the framework, the tests also serve to highlight how explanations might be adjusted to maximise plausibility. For the sole remaining causal explanation as provided by Causal Chain 2: Social Norms attaching to Model 4: Family Planning, the formulation of the Wife's Fertility Demand is preceded by the condition High-Fertility Related Positive Social Sanctions which is based on the Couple's joint perception of the social respect to be generally gained by couples based on the number and sex composition of children. Because these positive social sanctions are effective enough to be recognised and agreed upon by both Husband and Wife (when interviewed separately), and are responsible for the formulation of Wife's Fertility Demand, it is highly likely that they are responsible for the formulation of Husband's Fertility Demand as well. This argument is borne out by the fact that for all three couples in the analysis Wife's Fertility Demand and Husband's Fertility Demand exhibit the same respective values, as does Couple's Fertility Demand (which is produced from their combination) as shown in the table on the next page.

Table 6.9	**Maximising plausibility of the remaining causal explanation by model adjustment**		
Readiness	**Case ID:**		
	W44	W60	W12
Wife's Fertility Demand (from Causal Chain 2: Social Norms)	0	1	1
	H44	H60	H12
Husband's Fertility Demand (from Model 1: Wealth Flows)	0	1	1
	C44	C60	C12
Couple's Fertility Demand (from Model 2: Security Assets)	0	1	1

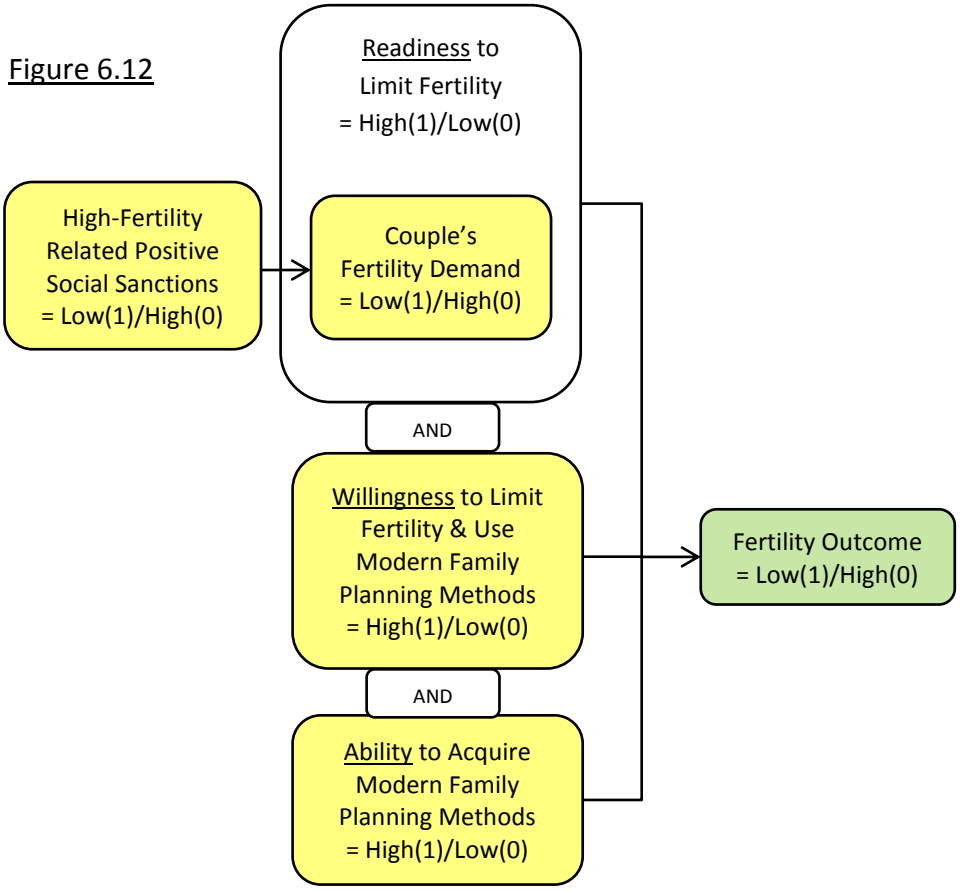
Given that both Wife's Fertility Demand and Husband's Fertility Demand exhibit the same values across all the relevant couples, that the very formulation of Wife's Fertility Demand depends on the joint perceptions of the Wife as well as the Husband, retaining Readiness in Causal Chain 2: Social Norms as being solely constituted by Wife's Fertility Demand, which implies either the irrelevancy or contradiction of Husband's Fertility Demand, appears inappropriate. Basing Readiness in Causal Chain 2: Social Norms on Couple's Fertility Demand in contrast appears to provide for a more plausible explanation which also does not render the attachment of Readiness AND Willingness any less plausible. That Willingness is based on the Group Fertility Outcome Norm of the Wife, and not that of the Couple, does not compromise the plausibility of the adjustment of Readiness to be constituted by Couple's Fertility Demand because both Willingness and Ability in Model 4: Family Planning relate by virtue of original specification exclusively in concept to the Wife as the sole implementer of modern family planning methods. It is not the case that the Husband's possible involvement in Willingness and Ability was initially specified and then later ruled out through the concept logical engineering process.

The Resulting Causal Explanation

The resulting causal explanation of the analyses is detailed in this section, and relates to the logically and conceptually representative Husband, Wife and Couple derived from C44, C60 and C12. The resulting casual explanation is presented in terms of the RWA framework, first diagrammatically and then through detailed discussion.

The Resulting Causal Explanation

Figure 6.12



The detailed discussion of the resulting causal explanation examines all four conditions and the Fertility Outcome, and how they relate to one another, followed by a brief summary.

High-Fertility Related Positive Social Sanctions

The condition High-Fertility Related Social Sanctions is based on the congruence of the independent perceptions of the Husband and of the Wife with regards to the social respect that would be gained in general by a couple according to varying quantity and sex composition of children, and precedes the Husband's Fertility Demand and the Wife's Fertility Demand.

Readiness to Limit Fertility

The Husband's Fertility Demand is constituted both by his demand at the start of marriage for the number of male and the number of female children, which when summed defines Husband's Demand at Start as Low(1) for a sum of ≤ 2 children and High(0) for a sum of ≥ 4 children, and by his Dynamic Son/Daughter Preference Based Fertility Demand (hereafter referred to as Dynamic S/D Demand).

Dynamic S/D Demand is operational if before the birth of the last child, the Husband prefers a child of a particular sex that is consistent with achieving the ideal sex composition of children in Demand at Start even though the ideal total number of children in Demand at Start is being exceeded with the birth of the last child. In other words, ideal sex composition is prioritised over ideal number of children. In such cases Dynamic S/D Demand = Present(0). If such son/daughter preference is held before the birth of the last child, but the last birth does not exceed the ideal number of children in Demand at Start, then Dynamic S/D Fertility Demand = Partial(--) and is irrelevant to overall Husband Fertility Demand because the consequence of son/daughter preference remains within the bounds of the ideal number of children. Dynamic S/D Demand = Absent(1) when either there is no son/daughter preference before the last birth, or the preference is inconsistent with the ideal sex composition in Demand at Start, for example the Husband wanted two male children in Demand at Start, but even though there is only one son, he exhibits a preference for a daughter before the last birth.

Husband's Fertility Demand is formulated on the basis that if Dynamic S/D Demand = Present(0) then automatically Husband's Fertility Demand = High(0) regardless of

whether the Demand at Start = High(0) or = Low(1), and if Dynamic S/D Demand = Absent(1) then it is Demand at Start = Low(1)/High(0) that solely determines Husband's Fertility Demand = Low(1)/High(0).

This is consistent with Sheps (1963:67) calculation that on average in order to achieve two desired sons, a couple will have to have 3.88 children, and to achieve two daughters, 4.12 children. At the level of the Husband, Wife and Couple in this study, whilst the desire to have 2 children equates to Fertility Demand at Start = Low(1), Dynamic S/D Demand = Present(0) equates to an effective demand for 4 children and renders Fertility Demand = High(0).

The formulation of Wife's Fertility Demand has a similar basis to that of Husband's Fertility Demand, with one key difference. For the Wife, it is her Dynamic S/D Demand = Present(0) AND Unrealised Fertility Incidences = Absent(0) (the absence of miscarriages or stillbirths) which produces Wife's Fertility Demand = High(0), whilst on the other hand when her Dynamic S/D Demand = Partial(--) or Absent(1) AND Unrealised Fertility Incidences = Present(1) this produces Wife's Fertility Demand = Low(1). This suggests that the adverse experiences of miscarriages or stillbirths cause a downward revision of effective fertility demand by the Wife (but not by the Husband).

Both Husband's Fertility Demand = Low(1)/High(0) and identical Wife's Fertility Demand = Low(1)/High(0) combine to produce Couple's Fertility Demand = Low(1)/High(0) to constitute the Couple's Readiness to Limit Fertility = High(1)/Low(0).

Willingness to Limit Fertility and Use Modern Family Planning Methods

The Wife's Willingness to Limit Fertility and Use Modern Family Planning Methods is based on the Group Fertility Outcome Norm and requires that 2 out of 3 of the Wife's emotionally-closest-to married women friends or married women relatives have a Low(1) or High(0) fertility outcome for the Wife to respectively acquire High(1) or Low(0) values for the Willingness condition. Implicit in this result is the notion of social learning with regards to the willingness to use modern family planning methods because given that the condition Family Planning Programming & N.G.O Exposure as originally hypothesised in Model 4: Family Planning is not part of the resulting causal

explanation, and therefore it does not affect Willingness, it is only through social learning that the required knowledge and therefore the willingness to use modern family planning methods could have been gained.

Ability to Acquire Modern Family Planning Methods

The Wife's Ability to Acquire Modern Family Planning Methods is simply based on the Wife's subjective expense of her mostly-used current method.

Fertility Outcome

The dependent outcome of the framework, the Fertility Outcome is based on the total number of living children (sons and daughters) a couple has. If the total number of living children ≤ 2 then Fertility Outcome = Low(1) whereas if the total number of living children ≥ 4 then Fertility Outcome = High(0).

It might be noted that Couple's Fertility Demand which constitutes Readiness, the Group Fertility Outcome Norm which constitutes Willingness, and Fertility Outcome are all based on the same definition of Low(1) fertility as ≤ 2 living children and High(0) fertility as ≥ 4 living children.

6.1.3 - Stage Three Analysis

Having arrived at the resulting causal explanation from the small-N investigation, stage three analysis seeks to assess the relevancy of the causal explanation to the relevant population of interest, that is, the urban poor of Chittagong.

The term 'relevancy' rather than generalisation is preferred to highlight the principle that the plausibility of the causal explanation developed from the small-N investigation is not impacted by the extent to which it is relevant to other cases in the population of interest. In the causal notional template provided by Mill's (1882) Composition of Causes upon which CMA proceeds, a low, or even a lack, of association between posited cause and effect in the population of interest serves to suggest there is an abundance of opposing causes defeating the effects of the posited cause. This does not render the causal explanation developed through the empirical examination of the cases in the small-N investigation any less plausible. It simply suggests that the relevance, and therefore usefulness, in terms of implication for policy or programme interventions, is extremely limited. Similarly, the plausibility of a causal explanation that proves highly relevant to the population of interest is not bolstered by this relevancy.

The assessment of relevancy necessarily requires that it be conducted against cases that are as similar as possible to those particular cases in the small-N investigation that were relevant to the development of the resulting causal explanation, that is, C44, C60 and C12. Attempting to extend the scope of relevancy beyond such similar cases runs the risk of seeking relevancy where none exists by virtue of case non-comparability.

There are two aspects of relevancy. The first aspect relates to the proportion of cases in the population of interest to which the causal explanation is potentially relevant. The second aspect is concerned with the degree of plausibility with which the explanation is relevant to matched cases in the population of interest, regardless of what proportion of the population of interest these matched cases constitute.

The assessment of relevancy therefore takes place through an examination of the secondary data to establish the proportion of the population of interest to which the

explanation is likely to be relevant, and the plausibility with which the explanation is relevant to the matched cases in the secondary data.

Assessment proceeds by use of the most recent data provided by the BDHS 2011 (NIPORT et al. 2013) which captures the data of 17,842 individual ever-married women between the ages 12-49, but also provides a subsample of the survey, the Couple's Recode, which captures data for responses provided by both women and their partners at the unit of the couple. The BDHS 2011 Couple's Recode contains 3,614 couple cases. Cases from the BDHS 2011 Couple Recode are selected to match cases C44, C60 and C12 as follows, with variable names indicated in parenthesis: Current age (V12) ≥ 25; Region (V24) = Chittagong; Residence (V25) = Urban; Educational Attainment (V106) = None or Primary; Religion (V130) = Islam or Hinduism; Births in the last 5 years (V208) = None; Currently pregnant (V213) = No/Unsure; Currently married (V501) = Yes; Number of unions (marriages) (V503) = Once.

This selection produces just 45 relevant matching cases from the BDHS 2011 data, which immediately rules out the possibility of establishing the proportion of the population of interest to which the explanation is likely to be relevant. A much larger sample size would be required to produce credible inferences relating to unexamined cases beyond the secondary data in the population of interest.

Accordingly, the assessment of relevancy has to satisfy itself with focusing on the second aspect of relevancy, that is, with assessing the plausibility with which the explanation is relevant to the matched cases in the secondary data. These 45 cases are further split into two groups exhibiting Fertility Outcome = Low(1) for those with ≤ 2 living children, which provides 15 relevant cases, and those exhibiting Fertility Outcome = High(0) for those couples with ≥ 4 living children, which also provides 15 relevant cases. The assessment therefore proceeds below on the basis of examining patterns amongst these cases with regards to Husband's vs. Wife's Fertility Demand (V621), whether the Husband and Wife are both involved in the decision making with regards to using contraception (V632), ideal number of children (V613), and ideal number of boys, girls and children of either sex (V627-9).

Husband's vs. Wife's Fertility Demand

Both the husband and the wife in the vast majority of couples have the same Fertility Demand. This supports the relevancy of the Social Norms explanation which incorporates Couple's Fertility Demand based on the combination of Husband's Fertility Demand AND Wife's Fertility Demand with the same values of Low(1) or High(0).

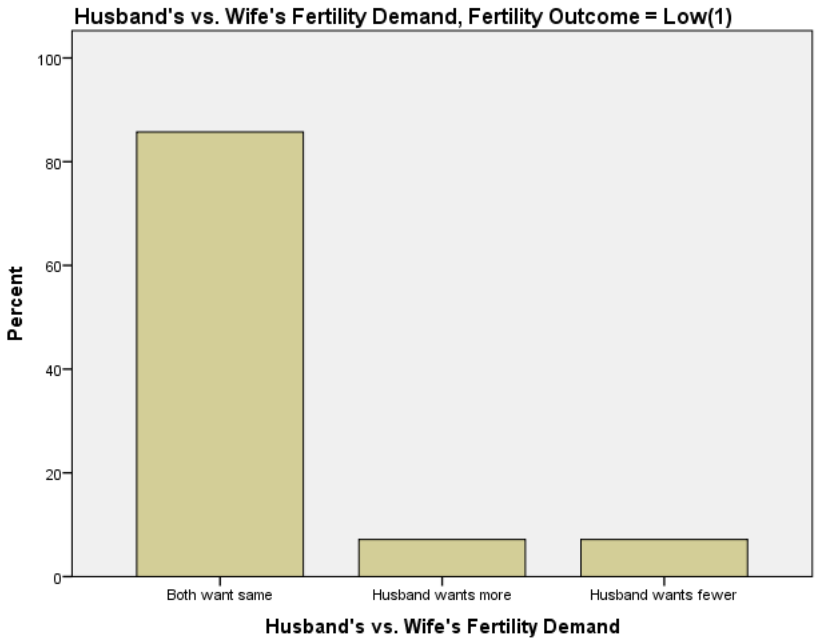


Figure 6.13, Source: NIPORT et al. 2013

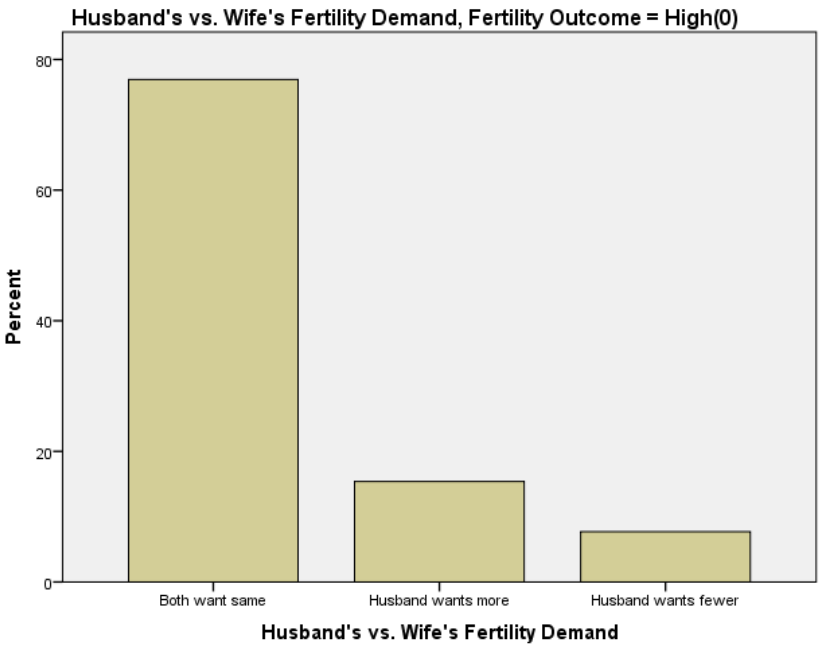


Figure 6.14, Source: NIPORT et al. 2013

Decision Maker for Using Contraception

One major implication of the Husband and Wife having the same Fertility Demand in the Social Norms explanation is that the decision making for using contraception, that is, the translation of the Couple's Fertility Demand, whether Low(1) or High(0), into practical behaviour, might also be an issue of joint consideration. The vast majority of couples exhibit this behaviour.

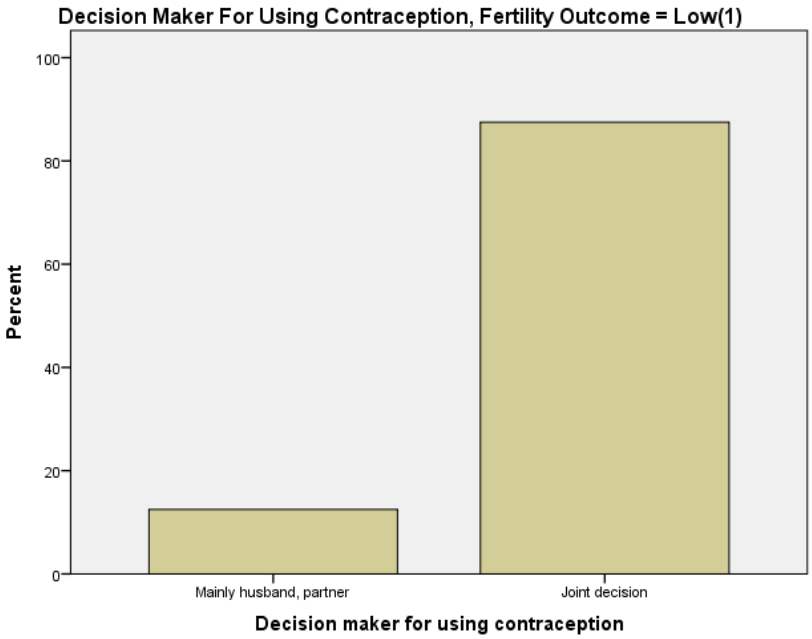


Figure 6.15, Source: NIPORT et al. 2013

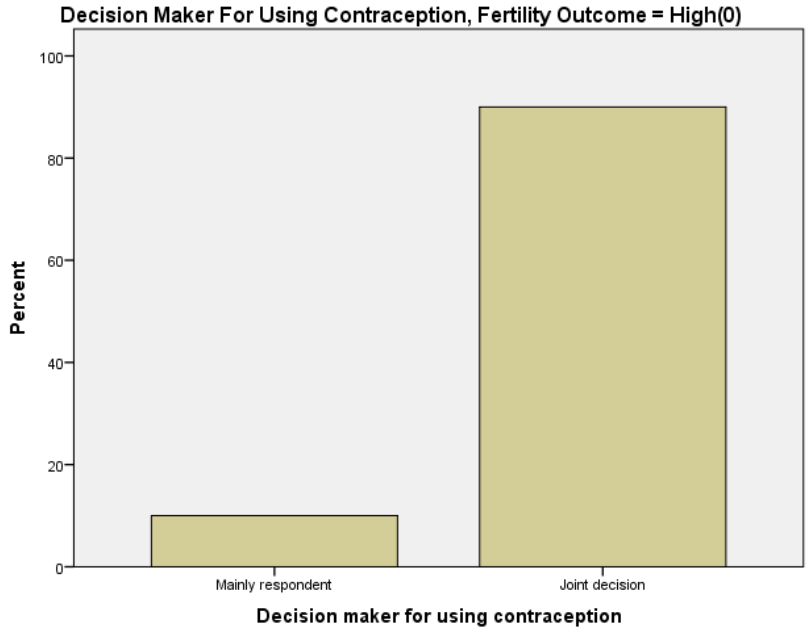


Figure 6.16, Source: NIPORT et al. 2013

Ideal Number of Children

A comparison of the ideal number of children for couple's with Low(1) and High(0) Fertility Outcomes suggests the majority with Fertility Outcome = Low(1) have a Low(1) ideal number (≤2). Those with Fertility Outcome = High(0) tend to exhibit a very similar distribution for ideal number across 2, 3 and 4 children.

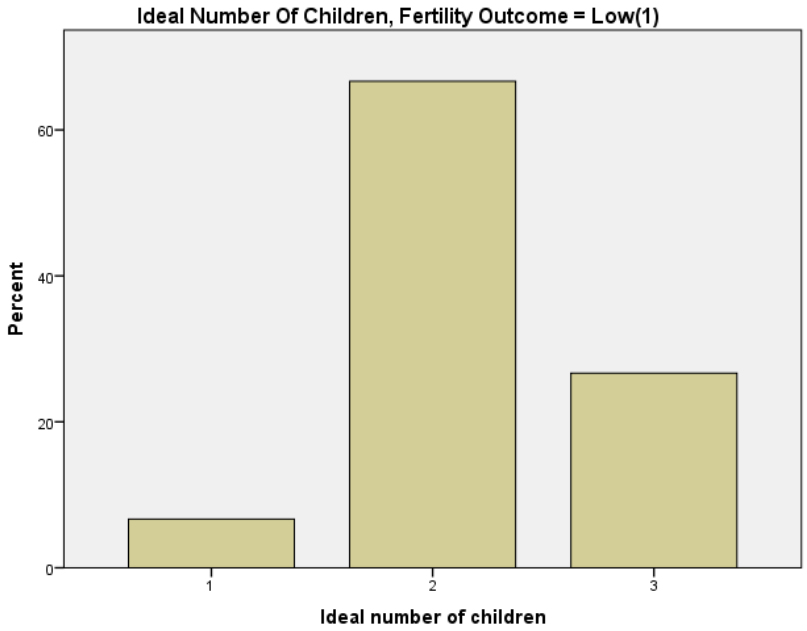


Figure 6.17, Source: NIPORT et al. 2013

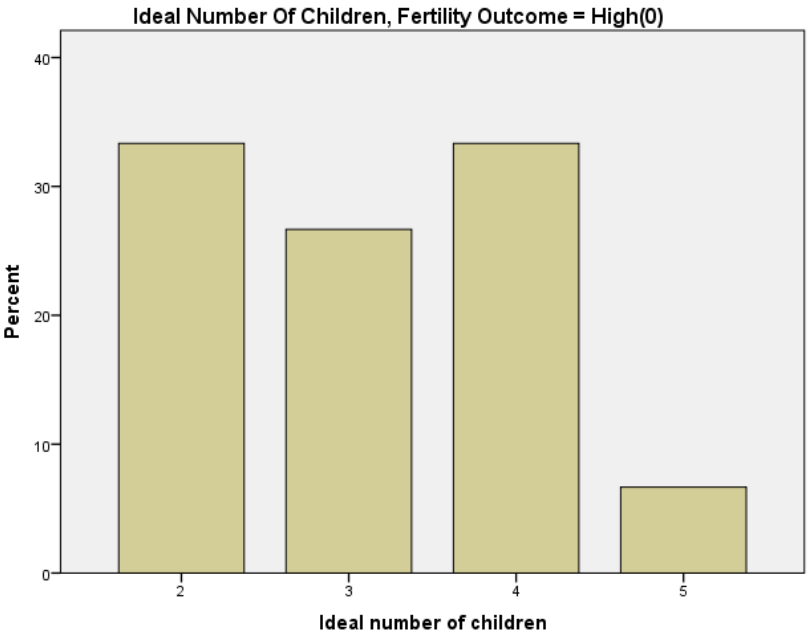


Figure 6.18, Source: NIPORT et al. 2013

Ideal Number of Boys

The vast majority of couples with Fertility Outcome = Low(1) exhibit a preference for 1 son whereas for couples with Fertility Outcome = High(0), half exhibit a preference for 2 sons and a third exhibit a preference for 1 son. These trends are highly consistent with the formulation of Fertility Demand in the Social Norms explanation which is based on both Demand at Start (the ideal) and Dynamic S/D Demand.

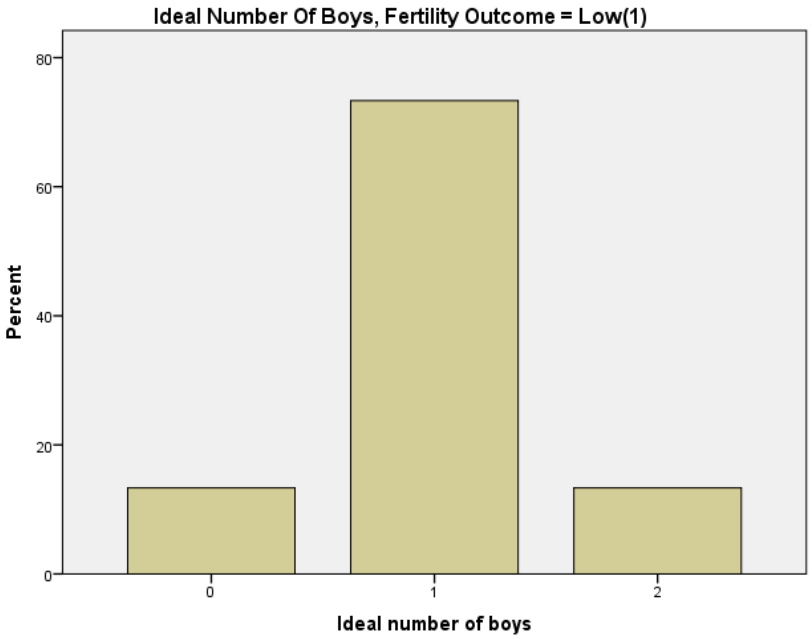


Figure 6.19, Source: NIPORT et al. 2013

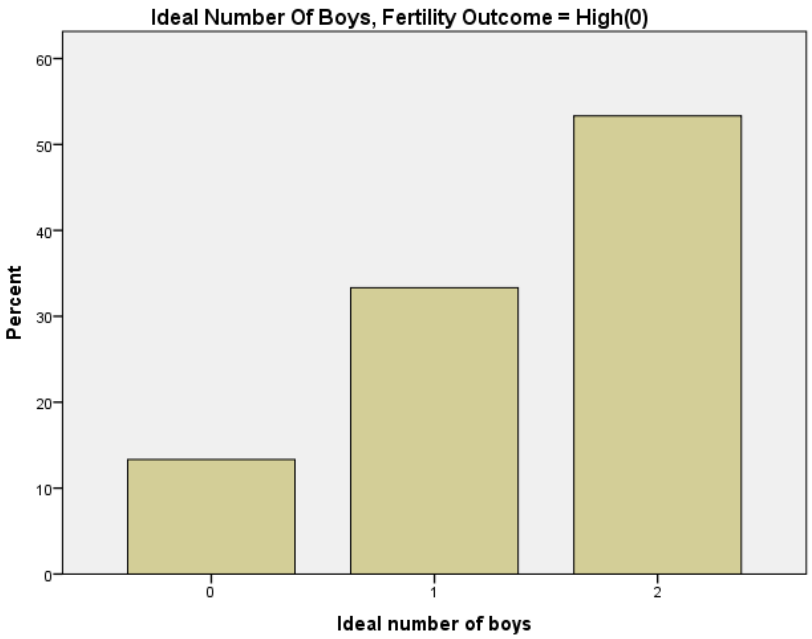


Figure 6.20, Source: NIPORT et al. 2013

Ideal Number of Girls

With regards to the ideal number of girls, the pattern exhibited is fairly similar for couples regardless of their fertility outcome. For couples with Fertility Outcome = Low(1), the vast majority have an ideal of 1 girl, whereas for couples with Fertility Outcome = High(0), slightly over half have an ideal of 1 girl, with a quarter exhibiting an ideal of 2 girls.

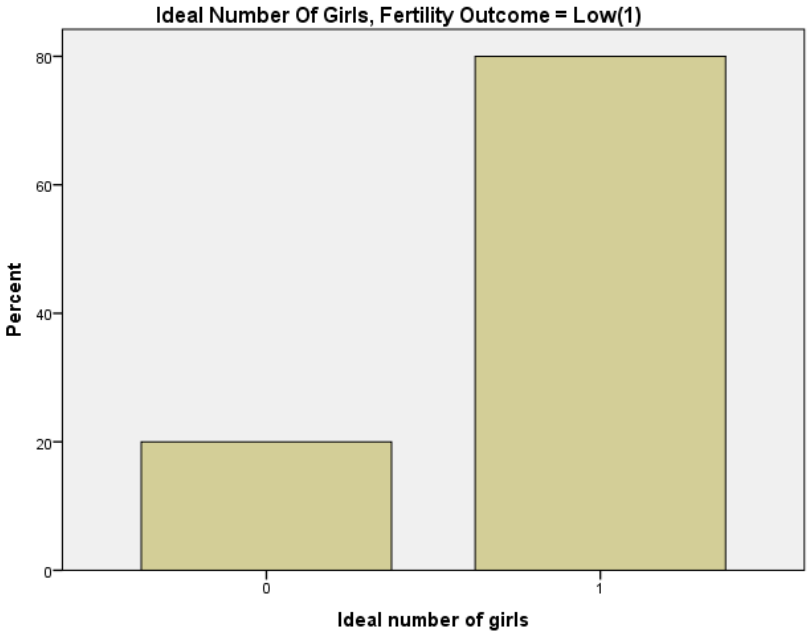


Figure 6.21, Source: NIPORT et al. 2013

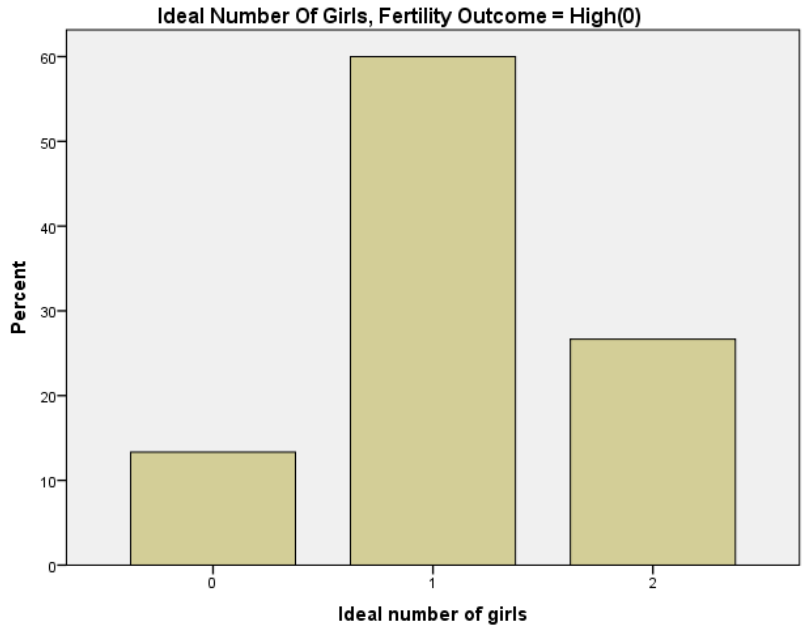


Figure 6.22, Source: NIPORT et al. 2013

Ideal Number of Children of Either Sex

The vast majority of couples of either Fertility Outcome exhibit the tendency not to formulate an ideal for a number of children that is devoid of preferences with regards to sex composition. These trend is highly consistent with the formulation of Fertility Demand in the Social Norms explanation which is based on both Demand at Start (the ideal) and Dynamic S/D Demand.

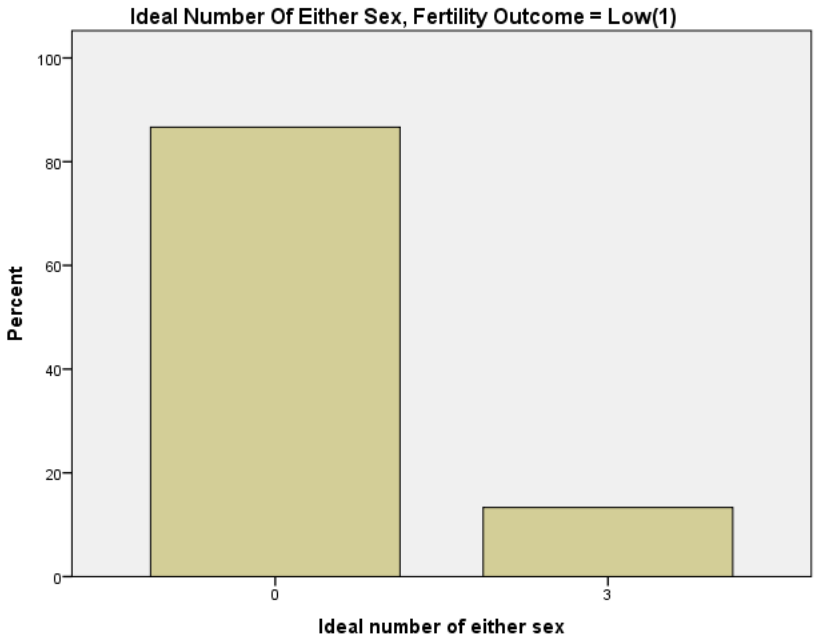


Figure 6.23, Source: NIPORT et al. 2013

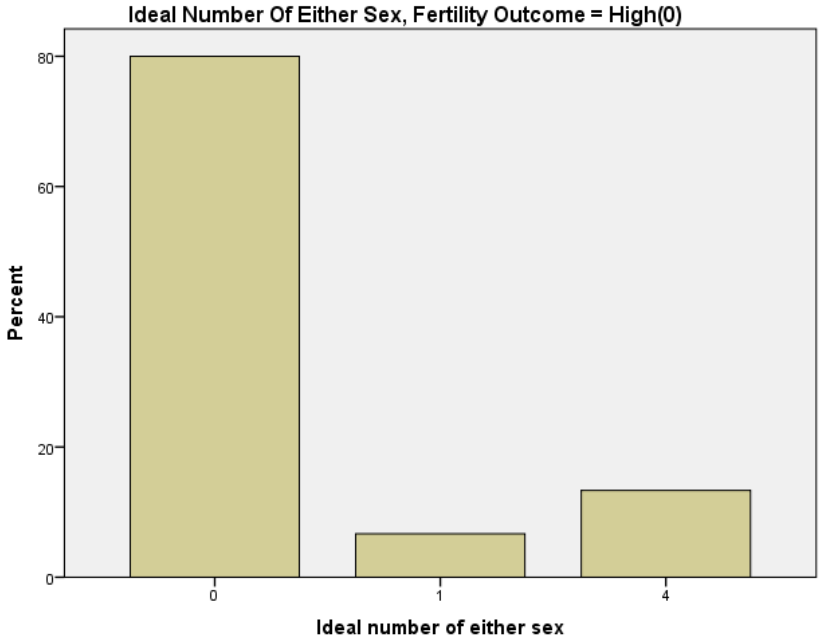


Figure 6.24, Source: NIPORT et al. 2013

Summary of the Relevancy of the Causal Explanation to the Population of Interest

Patterns exhibited by the couples examined from the BDHS 2011 plausibly suggest that beyond the relevant cases examined in the small-N investigation from whom the Social Norms explanation was developed, that is, C44, C60 and C12, there is a closely matched group of couples within the wider population of interest for whom the Social Norms explanation is relevant.

The patterns exhibited by this group as a whole provide strong support for the plausibility of the relevancy of the Social Norms explanation to this group.

First, for approximately 80% of the couples in this group, the husband and wife have the same Fertility Demand as each other regardless of whether their Fertility Outcome is Low(1) or High(0). In the Social Norms explanation Readiness is constituted by combining Husband's Fertility Demand and Wife's Fertility Demand to produce Couple's Fertility Demand, regardless of whether their Fertility Outcome is Low(1) or High(0).

Second, for approximately 90% of couples in this group, the husband and wife tend to make joint decisions with regards to the use of contraception, regardless of whether their Fertility Outcome is Low(1) or High(0). In the Social Norms explanation, Readiness is based on the Couple's Fertility Demand and preceding this is the condition High-Fertility Related Positive Social Sanctions which is based on the alignment of the Husband's and Wife's perceptions of social approval with regards to the quantity and sex composition of children. Both of these conditions apply to Couples regardless of whether their Fertility Outcome is Low(1) or High(0). The observed pattern in secondary data of joint decision making with regards to the use of contraception is supportive of the Social Norms explanation's emphasis on the alignment between Husband and Wife with regards to the formulation of Fertility Demand.

Third, in this group approximately one third of couples who have an ideal number of children as Low(1) end up having a Fertility Outcome as High(0). The Social Norms explanation provides an understanding of this phenomenon based on the potential for sex composition preferences to dynamically adjust both Husband's Fertility Demand

and Wife's Fertility Demand upwards to High(0) even when their ideal number of children, Demand at Start, is Low(1).

Fourth, and related to the previous relevancy, approximately 80% of couples in this group do not formulate their ideal fertility preferences devoid of preferences with regards to sex composition. In the Social Norms explanation a key component in the conceptual formulation of both Husband's Fertility Demand and Wife's Fertility Demand, and therefore Couple's Fertility Demand, is the importance of sex composition.

That the Social Norms explanation appears so highly relevant to the patterns exhibited by the selected couples in the BDHS 2011 strongly suggests that the explanation has a high degree of plausible relevancy to a group of couples within the population of interest beyond the couples examined in the small-N investigation from which it was developed. The proportion of the population of interest however which is constituted by this group of couples remains highly uncertain due to the very limited number of matched couples provided by the BDHS 2011 preventing the formulation of credible inferences in this regard.

6.1.4 - Delivering the Response to the First Research Question

The first research question of the study is: What are the major determinants and underlying causal mechanisms of differing fertility outcomes within the urban poor of Chittagong?

The micro-foundational level identification of the major determinants and the causal mechanisms that produce differing fertility outcomes within the urban poor of Chittagong proceeded with a small-N based and in-depth theory driven examination of the situations, motivations, preferences and decisions of the separate individuals that constitute a couple, and of the couple as a whole, in relation to desired fertility outcome, and how these decisions are enabled through choice of, access to, and the use of modern family planning methods so as to produce the desired fertility outcome. The overall organising framework employed was that of the RWA framework.

In approaching this question, which demanded the development of a causal explanation for differing fertility outcomes rather than a description, primacy was accorded to depth of explanation rather than generalisability of explanation. As such, an explanation for differing fertility outcomes applicable to the whole of the population of interest was never sought, nor expected to exist in terms of the notions of causation adopted methodologically. Rather, the explanation developed through the small-N investigation was considered to be potentially relevant to an unknown proportion within the population of interest, with an assessment of relevancy expected to provide both an understanding as to the likely extent of that proportion as well as to the degree of plausibility with which the explanation is likely to be relevant to that particular group within the population of interest.

The inability to assess the first aspect of relevancy due to an insufficient number of matched cases in secondary data presents a challenge in the development of a response to the second research question of the study, which will be examined next. The result of the assessment of relevancy with regards to the degree of plausibility with which the developed explanation is relevant to a particular group within the population of interest however suggests a high degree of plausibility in this regard. Accordingly the response to the first research question of this study is provided by the developed causal explanation referred to as the Social Norms explanation.

The Social Norms explanation comprises the causal chain organised under the RWA framework from the exogenous condition High-Fertility Related Positive Social Sanctions through to the Fertility Outcome. The explanation is causally symmetric – it applies equally to couples with a low fertility demand/outcome of ≤ 2 living children as well as to those with a high fertility demand/outcome of ≥ 4 living children.

For couples in the group of relevance within the population of interest, the Husband and Wife hold aligned perceptions with regards to the social respect to be gained according to the quantity and sex composition of children. These High-Fertility Related Positive Social Sanctions tend to produce the Husband's Fertility Demand and the Wife's Fertility Demand.

The Husband's Fertility Demand is constituted both by his demand at the start of marriage for the total number of children, and by dynamic adjustments based on the importance given by him to sex composition and whether it is being attained.

The Wife's Fertility Demand is constituted in the same manner as the Husband's Fertility Demand except that the experience of miscarriages or stillbirths can produce a dynamic downward revision of the Wife's Fertility Demand provided the importance given by her to sex composition is not high.

Both the Husband's Fertility Demand and the Wife's Fertility Demand combine to produce the Couple's Fertility Demand which constitutes their Readiness to Limit Fertility.

The Wife's Willingness to Limit Fertility and Use Modern Family Planning Methods is based on the concept Group Fertility Outcome Norm which refers to the fertility outcomes of her three emotionally-closest-to married women friends or married women relatives.

The Wife's Ability to Acquire Modern Family Planning Methods is based on her subjective expense of her mostly-used current method.

Thus formulated, Readiness AND Willingness AND Ability then combine and tend to produce the Fertility Outcome.

Although in arriving at the Social Norms explanation, one of the criteria for case selection in the small-N investigation was the absence of any births during the five years preceding interview with a view to selecting only those couples whose Fertility Outcome could plausibly be considered terminal, and therefore by implication all the couples selected were proven effective contraceptors, none of the couples had experienced any unwanted pregnancies throughout their childbearing phases, that is, from the start of their marriage until their last successful childbirth, except for C22 due to the unexpected birth of twins instead of one desired additional child. Therefore, couples C44, C60 and C12, with a mixture of Fertility Outcome = Low(1)/High(0), and from whom the Social Norms explanation is developed also did not exhibit any unwanted pregnancies. This suggests that even for couples with Readiness = Low(0) AND Willingness = Low(0) AND Ability = Low(0) and therefore with Fertility Outcome =

High(0), their Willingness and Ability are not 'low enough' to result in unwanted pregnancies.

6.2 - Developing and Delivering the Response to the Second Research Question

The second question of the study is: How likely will family planning programmatic interventions succeed in reducing the fertility outcomes of the urban poor in Chittagong?

In the formulation of an answer to this question, in similarity with an ex-ante evaluation of a programme theory, there is a requirement to assess the plausibility of the programme theory through a comparison of the programme's theorised causal chain that links the intervention with the intended outcomes against available knowledge (see Brousselle & Champagne 2011:70).

The available knowledge against which the programme theory is to be assessed is provided by the output of the response to the first question of this study in the form of the Social Norms explanation, and highly relevant secondary sources such as data from the BDHS which is a key source of data referred to in the formulation of policy and programming in Bangladesh, programme documents and policy briefs.

The response to the second research question is delivered through the organisation provided by six sections: first, there is an examination of the current family planning programme's aims and priorities; second, a comparison is conducted between the family planning programme theory and Social Norms explanation to highlight their differing positions; third, a suggestive arbitration is sought as to the relative relevancy of the two positions in relation to the population of interest through an examination of behavioural trends in the general population of Bangladesh; fourth, an examination is conducted on the background and the rationale underlying the formulation of the current family planning programme theory; fifth, the response to the second research question is presented; and finally, recommendations are put forward.

It might be noted that in the use of the term Social Norms explanation, this refers to the entire formulation of the developed causal explanation incorporating the

exogenous condition High-Fertility Related Positive Social Sanctions, all three conditions of Readiness, Willingness, Ability and the Fertility Outcome.

6.2.1 - Family Planning Programme Aims and Priorities

At the time of formulation, the Health, Population and Nutrition Sector Development Program 2011-2016 established the following programme implementation targets with regards to national fertility (MOHFW 2011b:189):

• To reduce fertility from a TFR of 2.5 to 2.0 by 2016. The most recent data indicates a national TFR of 2.3 (NIPORT et al. 2013:60).

• To increase the Contraceptive Prevalence Rate of modern methods (CPR) from 61.7% to 72% by 2016.

• To reduce Unmet Need for family planning from 17.1% to 9% by 2016. The most recent data indicates Unmet Need is 13.5% (NIPORT et al. 2013:99).

• To reduce the Discontinuation Rate of family planning methods from 56.5% to 20% by 2016. The most recent data indicates a Discontinuation Rate of 35.7% (NIPORT et al. 2013:95).

• To increase the proportion of Long Acting and Permanent Methods (LAPM) as a share of the Contraceptive Prevalence Rate (CPR) from 7.3% to 20%. The share of LAPM only shows a hint of increase in the most recent data (NIPORT et al. 2013:87).

It may be recalled that the HPNSDP 2011-16 classifies Chittagong and Sylhet divisions as “low performing areas” in terms of CPR (MOHFW 2011b:307) and defines specific family planning targets at the divisional level exclusively with respect to these two high-priority divisions: to increase the CPR (modern methods) in Chittagong by 5% and Sylhet by 15% in order to achieve a level of 50% CPR (modern methods) in both divisions (MEASURE DHS 2013:2; MOHFW 2011a:61; MOHFW 2011b:307), with particular emphasis on the promotion of LAPMs in these low performing areas (MOHFW 2011b:XXI, 189; MOHFW 2012:7).

The theory of the family planning programme identifies “considerable discontinuation rate and unmet needs” (MOHFW 2012:4) as the key impediments to further declines in

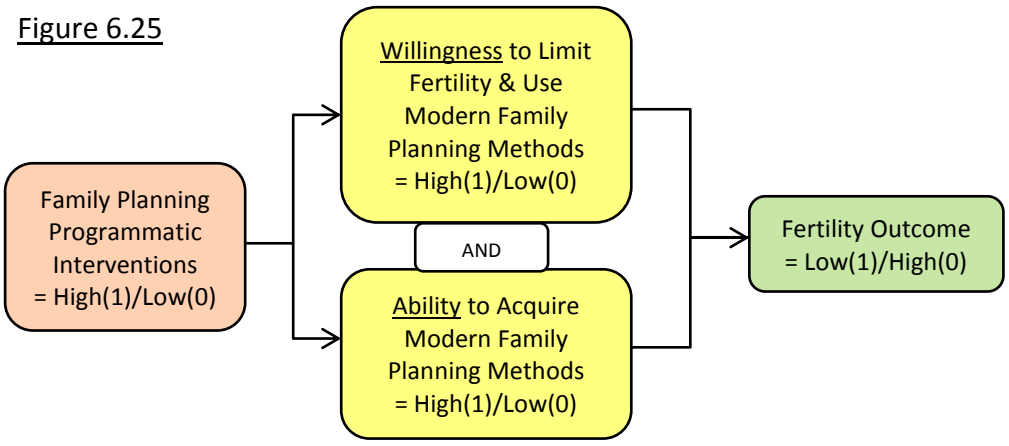
the fertility rate, and LAPMs are emphasised as the major solution because "many women have completed their childbearing by the mid-late twenties, leaving them with two decades of reproductive life to avoid unwanted pregnancies" (MOHFW 2011b:188). An increase in the overall CPR and a reduction in TFR can therefore be thought of as consequential to the successful realisation of the three key targets of reducing Unmet Need, reducing the Discontinuation Rate and increasing the proportion of LAPMs as a share of the CPR.

6.2.2 - A Comparison of the Programme Theory and Social Norms Explanation

In order to facilitate a comparison between the programme theory and the Social Norms explanation the programme theory is specified in terms of the RWA framework.

Programme Theory in terms of the RWA Framework

Figure 6.25



When presented in terms of the RWA framework, the programme theory assumes that Readiness to Limit Fertility = High(1) already exists in the population of interest, and so is not included in the diagrammatic representation.

Family Planning Programmatic Interventions = High(1) is theorised to result in both Willingness to Limit Fertility & Use Modern Family Planning Methods = High(1) and Ability to Acquire Modern Family Planning Methods = High(1). In combination, (with assumed Readiness = High(1)), Willingness = High(1) AND Ability = High(1) is then expected to result in Fertility Outcome = Low(1).

Of the programme's theorised two key impediments to further declines in fertility, the focus on lowering the Discontinuation Rate relates directly to addressing couples for whom Willingness = Low(0), because discontinuation implies these couples already have the Ability to acquire modern family planning methods but reject them after initial acquisition and use, and the focus on lowering Unmet Need relates directly to addressing couples for whom Ability = Low(0), because needs not being met implies that the Willingness of these couples to use modern family planning methods is not being met by adequate supplies. The emphasis on the promotion of LAPMs can be thought of as focused on addressing couples for whom both Willingness = Low(0) and Ability = Low(0) specifically in respect of LAPMs, even though their Readiness to Limit Fertility is assumed to be High(1) and LAPMs would offer them unrivalled protection against unwanted pregnancies.

In the Social Norms explanation the Readiness to Limit Fertility, both High(1) and Low(0), is driven by the couple's desire to conform with the social norms of fertility in their social networks in order to gain social approval. In contrast, the programme theory proceeds on the assumption that the Readiness to Limit Fertility = High(1) already exists in the population of interest.

In the Social Norms explanation the Willingness to Limit Fertility & Use Modern Family Planning Methods, both High(1) and Low(0), is based on social network norms rather than Family Planning Programming & N.G.O Exposure. In contrast, the programme theory proceeds on the basis that Willingness can be adjusted through interventions focused on Discontinuation.

Whilst in the Social Norms explanation the Ability to Acquire Modern Family Planning Methods is based on subjective monetary costs, and Family Planning Programming & N.G.O Exposure are considered causally irrelevant to Ability, the programme theory proceeds on the basis that Ability can be adjusted through efforts to address Unmet Needs.

These glaring divergences between the programme theory and Social Norms explanation, both of which claim at least potential relevancy to the population of interest, presents an interesting puzzle. On the one hand it might be that there are very real Unmet Need and Discontinuation issues to be addressed through

programmatic interventions and the promotion of LAPMs would make a significant difference with regards to the avoidance of unwanted pregnancies. In this case the programme is likely to succeed through its correct identification of these key issues and its efforts to address them, with the implication that the Social Norms explanation is actually of very little relevancy to the population of interest. On the other hand if the Social Norms explanation, which suggests that even when Willingness = Low(0) AND Ability = Low(0) they are not 'low enough' to result in unwanted pregnancies, actually does have high relevancy to the population of interest, then the programme theory is flawed and efforts to reduce fertility in the population of interest will likely be unsuccessful.

Neither the programme theory nor the social norms explanation can claim a higher level of potential relevancy to the population of interest on the basis of direct empirical evidence at this level of depth in assessment. An examination next however of arbitrating observable implications presented in secondary data serves to provide a suggestive indication of which is more plausibly likely to have higher relevancy to the population of interest, and therefore whether the family planning programme is plausibly likely to be successful.

6.2.3 - Seeking Suggestive Arbitration Through General Trends in Bangladesh

The Social Norms explanation suggests that a group of couples within the population of interest tend to satisfy their Fertility Demand, both Low(1) and High(0), and then start using contraception in order to prevent unwanted pregnancies. The proportion of the population of interest that this group constitutes however is uncertain, as discussed previously. Behaviour with regards to the Couple's Readiness, Willingness and Ability to limit fertility is socially rational, likely to be consensual between husband and wife, and effective enough to avoid unwanted pregnancies. Once a couple's Readiness to Limit Fertility is satisfied, whether High(1) or Low(0), Willingness and Ability aligns as well but contraception is used effectively in both types of couple. This stands in contrast to the programme theory which assumes Readiness to Limit Fertility = High(1) but Willingness and Ability lag behind with the consequence of unwanted pregnancies. The programme theory is supply side driven with regards to Ability, whilst

efforts to address Willingness can be thought of as being focused on the link that connects a couple's demand to limit fertility with the available supply of contraception.

Bearing in mind that the formulation of policy and programmes in Bangladesh draws heavily on data provided by the BDHS, it is useful to examine potentially arbitrating patterns of behaviour in this data in order to provide a suggestive indication as to which position, that of the Social Norms explanation or the programme theory is more plausibly likely to reflect the behaviour of the population of interest. It needs to be emphasised however that the BDHS data examined in this section and subsequent sections relates to national trends in behaviour rather than specifically that of the urban poor of Chittagong, with the implication that the conclusions to be arrived at are only suggestive. The examination of these national trends rather than trends exhibited specifically by the population of interest is considered preferable however in view of the limited number of cases available in the BDHS data that match the tightly defined population of interest, based on couples C44, C60 and C12 in the small-N investigation, as seen previously in the assessment of the relevancy of the Social Norms explanation to the population of interest.

In Bangladesh, the current use of contraception varies by life-cycle stage. The use of modern methods increases from 42.4% usage amongst currently married women aged 15-19 to a peak of 61% for those aged 30-34 and then decreases to a low of 30.4% for those aged 45-49 (NIPORT et al. 2013:84). A similar inverted U shaped pattern of contraception usage by age also exists for the use of any methods, which includes both modern and traditional methods, and is a pattern that is observed in most countries (NIPORT et al. 2013:83-84). This pattern is consistent with the desire of younger women to have children, the desire of slightly older women who have children to avoid unwanted pregnancies, and the declining need for contraception amongst much older women due to their decreasing fecundity (NIPORT et al. 2013:83-84). The women of Bangladesh therefore tend to use contraception in a manner that is consistent with their Readiness to Limit Fertility at various stages of the life-cycle.

Similarly, the use of any contraceptive method by number of children increases steeply from 24.4% for women with no children to 64.7% for women with 1-2 children, 68.8% for women with 3-4 children, and then drops to 57.5% for women with 5+ children,

with this drop attributed to the declining fecundity of older, higher parity women (NIPORT et al. 2013:84-5). The women of Bangladesh therefore also tend to use contraception in a manner that is consistent with the avoidance of unwanted fertility once their Readiness to Limit Fertility has been satisfied.

Both these behavioural trends which emphasise the importance of the inclusion of the role of the Readiness to Limit Fertility in the use of contraception appear to support the Social Norms explanation and are at odds with the supply side emphasis of the programme theory.

With the potential relevancy of the Social Norms explanation to the population of interest suggestively supported by general patterns of behaviour exhibited in BDHS data, and the relevancy of the programme theory somewhat in doubt, a closer examination of the programme theory's emphasis on Unmet Need, Discontinuation and LAPMs, and how this relates to the Social Norms explanation is called for.

6.2.4 - Background and Rationale Underlying the Current Programme Theory

Given that the ultimate success of the family planning programme in reducing fertility in the population of interest rests fundamentally upon the successful realisation of the three key targets of reducing Unmet Need, reducing the Discontinuation Rate and increasing the proportion of LAPMs as a share of the CPR, the proceeding examination of the background and rationale underlying the current programme theory focuses specifically on these three programmatic intervention priorities.

Reducing Unmet Need

In essence the programme theory's emphasis on Unmet Need can be viewed as a conceptualisation of the Ability to Acquire Modern Family Planning Methods as being based on the particular aspect of Unmet Need.

Scrutiny of the definition of Unmet Need as specified in the BDHS 2011 (NIPORT et al. 2013) raises an important issue. Far from capturing an actual and present need for contraception that is going unsatisfied, the definition of Unmet Need embraces an inappropriately broad variety of circumstances.

For example, Unmet Need is considered as *present* for:

"women who are fecund and not using family planning and who say they want to wait two or more years for their next birth, or who say they are unsure whether they want another child, or who want another child but are unsure when to have the child….pregnant women whose current pregnancy was mistimed, or whose last pregnancy was unwanted but who now say they want more children…..amenorrheic women whose last birth was mistimed, or whose last birth was unwanted but who now say they want more children" (NIPORT et al. 2013:99).

The issue here is of course the idea of classifying women not using family planning who are unsure if they want another child, who want another child but are unsure when to have the child, or who now say they want more children, as experiencing Unmet Need.

In terms of the Social Norms explanation these women are most probably undergoing or have undergone a dynamic adjustment of their Readiness to Limit Fertility, and will not contracept, or not take contracepting seriously, until they have attained their new fertility target.

The definition of Unmet Need has also changed over time, and these changes for the most part appear to even further expand the scope of circumstances considered relevant for classification under Unmet Need. For example, the text italicised below was present in the BDHS 2004 (NIPORT et al. 2005) definition, but was absent from the BDHS 2007 (NIPORT et al. 2009) definition:

"Also included in unmet need for spacing are fecund women who are not using any method of family planning and say they are unsure whether they want another child or who want another child but are unsure when to have the birth. *unless they say it would not be a problem if they discovered they were pregnant in the next few weeks"* (NIPORT et al. 2005:106, emphasis added; see also NIPORT et al. 2009:92).

Therefore, women who would have specifically stated that they would not find it a problem if they discovered they were pregnant in the next few weeks are classified as experiencing Unmet Need from the BDHS 2007 onwards.

Also present in the BDHS 2004 definition, but completely removed from the BDHS 2007 definition is this entire sentence:

"Excluded from the unmet need category are pregnant and amenorrheic women who became pregnant while using a method (these women are in need of a better method of contraception)" (NIPORT et al. 2005:106, original parentheses).

Recorded Unmet Need jumped from 11% in the BDHS 2004 to 17% in the BDHS 2007 (NIPORT et al. 2009:91). The BDHS 2007 acknowledges that changes in the definition for Unmet Need have occurred, without explicitly referring to which changes, and states "these adjustments do not greatly affect the comparability of the results. The apparent increase in unmet need may reflect problems with the supply of family planning services and/or an increase in demand for family planning. Unmet need has increased across all ages, all educational groups, both urban and rural areas, and all administrative divisions" (NIPORT et al. 2009:91).

This argument amounts to the claim that changes in supply of family planning services and/or increases in the demand for family planning occurred without exception uniformly across all the different segments of population with different background characteristics across the whole of Bangladesh.

The most recent definition of Unmet Need in the BDHS 2011 exhibits some more modifications, as well as a reduction in Unmet Need to 13.5% (NIPORT et al. 2013:99). The BDHS 2011 Policy Brief casts serious doubt on this figure, not on the basis of definitional problems and inconsistencies, but due to the high rates of family separation which occur mainly due to husbands' labour migration:

"The high rate of family separation suggests that the unmet need of 13.5 percent reported in the 2011 BDHS may actually be lower, closer to the HPNSDP 2016 target of 9 percent" (MEASURE DHS 2013:3).

In summary, both the definition of Unmet Need and the calculation of its rate are highly questionable. Yet a key premise of the family planning programme theory is that Unmet Need is "considerable" (MOHFW 2012:4). The examination of Unmet Need serves to suggest that the programme theory is likely to be based on overstated estimates of Unmet Need and therefore interventions to address Ability based on Unmet Need are unlikely to contribute to a reduction in fertility to the extent

envisaged in the programme theory. In contrast for the Social Norms explanation, Unmet Need does not constitute a relevant aspect of Ability – subjective cost does.

Reducing Discontinuation

The programme theory's emphasis on Discontinuation can be viewed as a conceptualisation of Willingness to Limit Fertility & Use Modern Family Planning Methods based on the issue of Discontinuation (after initial use) rather than initial use being impeded by Willingness = Low(0).

With regards to Discontinuation, the family planning programming target was formulated as the reduction of the Discontinuation Rate of contraceptive methods from 56.5% to 20% by 2016 (MOHFW 2011b:189).

The national pattern for all Discontinuations by reason in the five years preceding the BDHS 2011 is presented in the following table and provides a useful basis by which to suggestively assess the potential relevancy of the programme theory to the population of interest with regards to Discontinuation.

Table 6.10 **Percent distribution of Discontinuations occurring in the five years preceding the BDHS 2011 by main reason stated**	
Reason:	All Methods:
Side effects/Health concerns	29.3%
Desire to become pregnant	26.2%
Method failure (i.e. became pregnant while using)	15%
Other fertility related reasons (i.e. husband away/ menopausal/marital dissolution or separation)	13.7%
Wanted more effective method	5.4%
Other method related reasons such as lack of access (1.4%)/ cost (0.4%)/inconvenient to use (3.5%).[78]	5.3%
Husband disapproved	1.4%
Other reason	0.6%
Up to God/fatalistic	0.1%

Source: NIPORT et al. 2013:96

[78] Whilst in the Social Norms explanation the Ability to Acquire Modern Family Plannning Methods is based on subjective cost (in terms of method used), this BDHS statistic refers only to cost as a reason for Discontinuation. It does not therefore lend itself to a suggestive assessment of Ability in the Social Norms explanation against general trends.

Discontinuation of contraceptive usage within the first 12 months of use by reason exhibits a similar pattern to that over the preceding five years, with side effects/health concerns provided most frequently as the main reason (11.4%) followed by desire to become pregnant (7%), other fertility related reasons (6.3%) and method failure (4.1%) (NIPORT et al. 2013:95).

The strategic plan for reducing Discontinuation Rates asserts that "discontinuation in the first year by new adopters can be halved" (MOHFW 2011a:12) through the provision of better counselling on side effects, increasing the number of fieldworkers, providing family planning supplies from static service points, adopting a region-specific approach and emphasising a greater role for N.G.Os and the private sector for servicing the inhabitants of urban slums (MOHFW 2011a:12).

Of these programmatic responses to Discontinuation only the first, the provision of better counselling on side effects, directly relates to any of the major reasons underlying Discontinuation. Additionally it might be noted that this is the only major reason for Discontinuation that relates to Willingness. Other major reasons for Discontinuation such as the desire to become pregnant, method failure that resulted in pregnancy and other fertility related reasons such as the husband being away, menopause and divorce do not call for or require programmatic responses such as increasing the number of fieldworkers and the provision of family planning services from static service points.

Given however the alignment of the programme theory's recognition to provide better counselling to address the issue of side effects/health concerns, which is the major reason for Discontinuation exhibited in the data, and given additionally the programme's emphasis on servicing slum inhabitants, which relates directly to the population of interest, the examination of the programme theory against BDHS data in relation to Discontinuations strongly suggests that effective interventions to address unfounded health concerns or insufficient knowledge with regards to using contraceptives in a manner that minimises potential health issues might be expected to successfully reduce fertility. It may be noted that the conceptualisation of Willingness in the Social Norms explanation is based entirely on social network norms, and whilst health concerns were examined during the formulation of the concept of

Willingness, they play no part in the resultant concept. In this respect therefore trends in the BDHS data provide suggestive support for the programme theory over that of the Social Norms explanation. A key issue however with respect to the likely success of programmatic interventions aimed at addressing Discontinuation due to health issues and concerns arises from the programme theory's emphasis on the promotion of LAPMs, which is examined next.

Promoting Long-acting and Permanent Methods (LAPM)

The promotion of LAPMs can be viewed as aiming to address both Willingness and Ability specifically in relation to LAPMs.

The discussion on LAPMs first provides an outline of the aims of the family planning programme in their promotion, second a brief overview of injectables and LAPMs, and their promotion in Bangladesh, and third examines the programme theory's underlying rationale in the promotion of LAPMs.

Programme aims in the promotion of LAPMs

Programming targets aim to increase the proportion of LAPMs as a share of the Contraceptive Prevalence Rate (CPR) from 7.3% to 20% (MOHFW 2011b:189).

The Strategic Plan for the family planning programme asserts that there is a "clear need for a shift from short-term methods to long acting and permanent methods (LAPM)" (MOHFW 2011a:12) and envisages this shift occurring through ensuring the supply of LAPM commodities remains uninterrupted, the provision of training to community field workers, the recruitment of additional personnel, the provision of a variety of incentive packages to increase the use of LAPM, and establishing partnerships with N.G.Os where necessary (MOHFW 2011a:12). With regards to such collaborations, the Project Implementation Plan goes further and specifies the outsourcing of LAPM services as part of public-private partnership or N.G.O collaborations in hard to reach and low performing areas (MOHFW 2011b:190).

The percentage distribution of currently married women aged 15-49 by modern contraceptive method currently used is: pill 27.2%, injectables 11.2%, male condom

5.5%, female sterilisation 5%, male sterilisation 1.2%, implants 1.1% and intrauterine devices (IUD) 0.7% (NIPORT et al. 2013:84). The last four of these are LAPMs.

With regards to the usage of LAPMs therefore, the Programme Implementation Plan notes:

"the proportions of couples relying on long-acting or permanent FP methods (IUD, implants, male or female sterilization) remains very low (less than 15%). Diversified and mass scale FP services will need to be undertaken to bring back the tempo of 1980s and achieve the target of fertility to replacement level" (MOHFW 2011b:188).

Streatfield & Kamal (2013:76-77) project the required changes in terms of the number of method users consistent with the required shift in the mix of methods to achieve the TFR target of 2.0 by 2016 as follows:

Table 6.11 **Projected required changes in number of contraceptors by method**

Method	**Change in Number of Method Users**
Oral Pill	-1.5 million
Traditional methods	-1.2 million
Condom	-225,000
Injectables	+2.7 million
Female sterilisation	+1.7 million
Implants	+1.5 million
Male sterilisation	+1.5 million
IUD	+1.4 million

Source: Streatfield & Kamal 2013

Given the aim in the Programme Implementation Plan to bring back the tempo of the 1980s in the promotion of LAPMs, and the vast numbers that stand to be involved and affected by the possible shift towards injectable contraceptives and LAPMs as indicated in the table above, a brief overview of injectables, LAPMs and their promotion in Bangladesh is in order before examining the programme theory's underlying rationale in the promotion of LAPMs.

An overview of injectables, LAPMs and their promotion in Bangladesh

The overview focuses first on injectables which, although not usually classified as a form of LAPM and could more appropriately be thought of as an 'intermediate' term method, are relevant in the overall family planning context of Bangladesh both in terms of historical background as well as due to the overall possible shift towards them in the future as highlighted in the table above, and then focuses on the three major forms of LAPMs, that is, sterilisation, implants and intrauterine devices.

Injectables:

In the early 1980s the family planning programme in Bangladesh was amongst a number of population control programmes in developing countries promoting the off-label usage of the drug Depo Provera as an injectable contraceptive (Shea 2007:6). At the time in the US Depo Provera was being used under an FDA Investigative Drug Permit in an experimental programme for the chemical castration for male sex offenders (Levine 1980:101).

It is alleged that women in Bangladesh were given Depo Provera without being informed of its ill-effects (TWN 1993:500).

The use of Depo Provera has been associated with irregular bleeding and the possibility of further side effects such as amenorrhoea, breakthrough bleeding and (rarely) serious haemorrhage (Parsons 1990:1). Heavy blood loss during menstruation is a cause of anaemia, a condition which has a persistently high prevalence amongst the women of Bangladesh, affecting 40% of pregnant women (Ahmed et al. 2012:3-4). Because the use of Depo Provera carries with it the elevated risk of developing anaemia or worsening the severity of the condition amongst current sufferers, Depo Provera appears to be highly unsuited for use in Bangladesh.

Studies have also found that Depo Provera may significantly cause a loss of bone density, that this loss increases with the duration of usage and may not be totally reversible leading to increased risks of osteoporosis (Shea 2007:8). Bangladeshi women already face a high risk of developing osteoporosis due to deficiencies in calcium and Vitamin D (Islam et al. 2003; Islam et al. 2008; Peterlik et al. 2009). For this reason also, Depo Provera appears highly unsuited for use in Bangladesh.

Today the Bangladesh family planning programme continues to promote the use of Depo Provera and has a supply requirement of one million injections per month (Streatfield & Kamal 2013:80).

Sterilisation:

In the 1980s Bangladesh implemented a crash programme to increase the adoption of LAPMs, in particular sterilisation, through the provision of incentives for both acceptors of sterilisation amounting to several weeks wages and clothing, as well 'fees' for doctors, health workers, clinic staff, midwives and even general members of the public who referred or motivated clients for the procedure, combined with punitive measures for family planning and health personnel who failed to meet their monthly sterilisation quotas (Hartmann 2011:1). The number of sterilisations rose from 182,782 in 1979-80 to 552,167 in 1983-4 (Streatfield & Kamal 2013:81) amid rampant abuse such as the denial of food aid to women destituted during the flood season unless they first agreed to be sterilised (Hartmann 2011:1). Rates of sterilisation were particularly high in the lean season prior to harvest, that is, during the time of the year when peasants were especially desperate for money to buy food (Hartmann 2011:1). In the late 80s with the coercive implementation of the programme becoming increasingly publicised, incentives for sterilisation were abandoned and programmatic emphasis shifted to the promotion of non-permanent methods (Schuler, Hashemi & Jenkins 1995:132; Streatfield & Kamal 2013:81).

Coercion however is not the only issue surrounding sterilisation. A study of just under 3000 women in rural Bangladesh finds that tubectomy acceptors are four times as likely to report symptoms of reproductive tract infection as non-users of any contraceptive method and seven times as likely to have examination-confirmed infections (Wasserheit et al. 1989).

Implants:

Norplant is a subdermal contraceptive implant containing six silicon rods that are inserted in a woman's arm to release a synthetic version of the hormone progesterone over a period of five years (UBINIG 1990:2; Watkins 2010:88). Developed during the 1960s and 70s by the Population Council, a New York based private non-profit

organisation focusing on international population, Norplant was designed to combine the hormonal control of the pill with the long-term protection of the intrauterine device (IUD) for women who would not remember to take the daily pill, did not want to be permanently sterilised and were unsuited to IUD use (Hardon 2006:618; Watkins 2010:90).

In the early 1980s the Population Council began a programme of clinical and acceptability trials for Norplant involving 44 developing and developed countries, including Bangladesh, where women's health advocates in response to advertising which failed to indicate that Norplant was a trial drug and its mis-informative promotion by family planning workers mobilised a petition sent to the Minister for Health and Population Control which resulted in the trial being postponed (Hardon 2006:618-9; UBINIG 1990:3).

In 1985 a new secret trial of Norplant in Bangladesh was discovered by women's health advocate groups through a development worker who had been working with women living in the slums of Dhaka city (UBINIG 1990:8). In similarity with the first trial of Norplant in Bangladesh there were serious and credible doubts as to whether the women using Norplant were aware they were involved in a trial (UBINIG 1990:15).

In early 1989 the Government of Bangladesh made the decision to promote Norplant through the family planning programme with an initial phase involving 32 clinics (UBINIG 1990:20). At this point US FDA approval had yet to be granted to Norplant.

Subsequent to receiving US FDA approval in 1990, and with its introduction into the US and UK, Norplant by the late 1990s had become the subject of mass legal action in both countries by women claiming to have suffered a variety of side effects from its use such as non-stop bleeding, hair loss, headaches, weight changes and suicidal depression in addition to experiencing problems associated with the insertion of the implant such as infection and with its removal which at times required lengthy operations under general anaesthesia (Hardon 2006:621; Watkins 2010:88, 99). Under negative publicity and with low sales, Norplant was eventually withdrawn from the UK in 1999 and from the US in 2002 (Hardon 2006:621; Watkins 2010:103-104).

In Bangladesh the promotion of Norplant continued up until 2008 when its manufacture was discontinued (Dickens 2008:28). By this time a new generation of one and two rod subdermal contraceptive implant systems including Implanon, Jadelle and Sino-Implant II were becoming available to population control programmes around the world (Ramchandran & Upadhyay 2007:1).

With the discontinuation of Norplant, and following the completion of *acceptability* (not safety) trials, the Directorate General of Family Planning Bangladesh (DGFP) approved the use of both Implanon and Jadelle, although up until December 2012 with Jadelle still in the pipeline of the procurement process, Implanon was the only implant available through the family planning programme (Mahboob-e-Alam, Hossain & Searing 2012:1). The results of 11 international clinical trials on Implanon indicate common side effects such as headaches, weight gain, breast tenderness, emotional liability, abdominal pains and irregular bleeding patterns, with 35% of trial subjects discontinuing use prematurely (Darney et al. 2009).

Sino-Implant II has been manufactured and available in China since the mid 1990s (Ramchandran & Upadhyay 2007:3). With Implanon and Jadelle roughly four times the public sector unit price of $4.50-$7.50 for Sino-Plant II (Ramchandran & Upadhyay 2007:5) and the high unit prices of Implanon and Jadelle considered by the DGFP to be a major barrier to implant availability in Bangladesh (Mahboob-e-Alam et al. 2012:1), a 12 month study commenced in June 2011 to assess the *acceptability and effectiveness* (not safety) of Sino-Implant II among 595 women across 10 study sites in Bangladesh (Mahboob-e-Alam et al. 2012).

The final report of this study recommended that “Sino-Implant (II) should be introduced in the national family planning program, as it is safe and effective and acceptable to Bangladeshi women” (Mahboob-e-Alam et al. 2012:18). The report however also notes that a large proportion of subjects were unhappy about changes to their menstrual patterns and that a number of women had resorted to the use of the oral contraceptive pill for several months in attempts to alleviate these side effects but that either the side effects had not disappeared or they re-asserted after discontinuation of the pill (Mahboob-e-Alam et al. 2012:17-18).

Sino-Implant II, Jadelle and Norplant contain the same synthetic hormone, levonorgestrel, and trials confirm that Sino-Implant II offers no advantage in terms of contraceptive effectiveness or safety over Norplant (Fan et al. 2004:102; Ramchandran & Upadhyay 2007:3).

Intrauterine Devices (IUDs):

IUDs were introduced in the 1980s into the Bangladesh family planning programme (Kamal 2000:47). Acceptance of the IUD has tended to lag behind that of other modern methods and today only 0.7% of all contraceptors (using both traditional and modern methods) use the IUD (NIPORT et al. 2013:86).

A recent study in Bangladesh finds that of 330 IUD acceptors 78.1% reported side effects, problems and complications, the main side effect was heavier menstruation and 47.3% of acceptors discontinued use in the first year (Bradley et al. 2009). In rural Bangladesh, both tubectomy and IUD users were each found to be four times more likely than non-users of any contraception to report symptoms of reproductive tract infections (RTI), and seven times more likely to have examination-confirmed infections (Wasserheit et al. 1989:69).

Streatfield & Kamal's (2013:76-77) projection of the required additional 1.4 million IUD acceptors as part of the shift in method mix to achieve the 2016 TFR target of 2.0 might be viewed as a conservative projection in view of the programme target which aims for 2.5 million IUD acceptors (MOHFW 2011b:190).

The programme theory's underlying rationale in the promotion of LAPMs

Although the Bangladesh HNPSDP Strategic Plan emphasises "the clear need for a shift from short-term methods to long acting and permanent methods (LAPM)" (MOHFW 2011a:12), the rationale underlying the need for this shift remains vague in all the examined programme planning documents. For example, the Programme Implementation Plan presents the low share of LAPMs itself as the key reason to increase it:

"The emphasis on short- and long-acting clinical methods, which was relatively high in the 1980s, has faded. The current pattern of temporary contraceptive use, with oral

pill users close to 30% of all married couples, is reaching saturation (only two other developing countries exceed this proportion), but other individual methods do not even account for 10% each. With persistent early marriage and low high fertility, many women have completed their childbearing by the mid-late twenties, leaving them with two decades of reproductive life to avoid unwanted pregnancies. However, the proportions of couples relying on long-acting or permanent FP methods (IUD, implants, male or female sterilization) remains very low (less than 15%). Diversified and mass scale FP services will need to be undertaken to bring back the tempo of the 1980s and achieve the target of fertility to replacement level" (MOHFW 2011b:188).

Implicit of course in this line of reasoning is the argument, with its focus on couple's who have completed their desired fertility, that LAPMs eliminate virtually any possibility of unwanted pregnancies occurring whereas short-term methods are subject to human error in implementation. The efficacy of LAPMs in the prevention of unwanted pregnancies is superior.

In contrast to programme documents, the BDHS 2012 Policy Brief is much clearer about a cost-based rationale for the emphasis on LAPMs:

"The national program can certainly attain the TFR target of 2.0 using the current method mix of mostly temporary methods. This mix is more costly and logistically complex. For example, a single implant or IUD can substitute for 60 oral pill cycles with 20 resupply visits. Sterilisation can substitute for 250+ pill cycles" (MEASURE DHS 2013:2).

Hardon (2006:614-15) notes that in the design of new technologies, researchers anticipate the interests, skills, motives and behaviour of future users, and these representations of future users are materialised into the design of the product. For the pill, the configured users were women who want to engage in sex without the risk of pregnancy, whilst due to high levels of non-compliance with the pill's daily regime, the configured users for longer-acting methods were family planners who required an effective tool to curtail population growth (Hardon 2006:614-15).

Women's health advocates have vigorously challenged the power that long-acting methods such as Norplant granted to family planners and questioned the claims of

scientists regarding their safety for women's health due to concerns that product efficacy was inscribed into the technology at the cost of safety (Hardon 2006:615).

Field studies conducted between 1989-1991 in Indonesia, Thailand and Brazil found that women who wanted Norplant removed faced various difficulties, including the categorical refusal by health workers to remove the device (Hardon 2006:619).

Whilst there are provisions in the Bangladesh programme plans for the management and treatment of complications and side-effects arising from the use of LAPMs (see MOHFW 2011b:188), it is unlikely that the removal of long-term method devices, implants and IUDs, will be prioritised in the same way that their insertion is – whilst the project implementation plan even provides for the training and incentivisation of LAPM acceptors as referral agents (see MOHFW 2011b:191) there is no training or incentive structure for device removals.

A key characteristic of LAPMs then, apart from efficacy and cost, is the transfer of the effective decision making power to cease the use of contraception from end-user to population planner.

Given that the programme is focusing upon the promotion of LAPMs in "low performing areas" (MOHFW 2011b:XXI), that is, Chittagong and Sylhet divisions which are the only two divisions for which there are CPR targets (MOHFW 2011a:61), given the emphasis on invigorating domiciliary visits in slum areas (MOHFW 2011b:189), and given that LAPM services in low performing areas will be outsourced under public-private partnerships or to government organised N.G.Os (MOHFW 2011b:190), there is a very real risk that the population of interest to which this study relates, that is, the urban poor of Chittagong, amongst others, will be subject to what might become an increasingly coercive population control programme. The outsourcing of LAPM services places the government at a moral and most likely legal distance from the implementation of the drive for LAPM acceptors on the ground, and this implementation runs the risk of being heavily skewed towards coercion and/or misinformation due to the incentivisation structures.

6.2.5 – Delivering the response to the second research question

The overall motivation for the study was driven by the aim of providing a response to the second research question: How likely will family planning programmatic interventions succeed in reducing the fertility outcomes of the urban poor in Chittagong?

The formulation of the response to this question draws on the principle underlying an ex-ante evaluation of a programme theory in which the plausibility of the programme theory is assessed by comparing the theorised causal chain linking the intervention with intended outcomes against available relevant knowledge (see Brousselle & Champagne 2011:70).

Providing an answer to this research question based solely on the Social Norms explanation is not appropriate because even though the assessment of relevancy conducted suggests that there is relevancy of the explanation to the wider population of interest beyond the cases examined in the small-N investigation, there remains uncertainty with regards to the proportion of the population of interest to which this relevancy applies. To appropriately inform programmatic interventions would require the confidence provided by empirical evidence that the explanation has relevancy to a substantial proportion of the population of interest.

Examination of the three key priorities of the family planning programme theory, that is, reducing Unmet Need, reducing Discontinuations and increasing the share of LAPMs, has proceeded on the basis of a comparison 'in principle' between the Social Norms explanation and the programme theory after its placement within the RWA framework, based on what is in essence the presumption that the Social Norms explanation might have substantial relevancy to the population of interest – whilst there is a lack of empirical evidence to support this presumption, there is no apparent evidence which refutes it either. As such, there was a need to resort to the suggestive arbitration offered by national trends exhibited by the recent BDHS.

Even the combination of the two sources of knowledge however, provided by the Social Norms explanation and the BDHS, whilst based firmly in empirical evidence, falls far short of providing a sufficiently credible basis for arriving at a plausible assessment

of the programme's likelihood of success in reducing the fertility of the population of interest: whilst on the one hand there is uncertainty as to whether the Social Norms explanation is sufficiently generalisable to a substantial proportion of the population of interest, on the other hand the national trends exhibited in the recent BDHS are not sufficiently specific to the population of interest.

The very process of this 'in principle' examination however has served to bring to light serious issues and internal inconsistencies within the programme theory itself which cast serious doubt on the programme's likelihood of success in reducing the fertility of the population of interest. As such, even the analytical advantage provided by the RWA framework is unnecessary for the discussion that follows which addresses the programme theory directly in its own terms with regards to its specified priorities.

With regards to the priority of reducing Unmet Need, the programme theory's understanding of existing levels and the formulation of reduction targets were based entirely on the data provided by the BDHS 2007 (see MOHFW 2011b:189). The examination of Unmet Needs conducted above however confirms that significant changes in the BDHS definition of Unmet Need occurred after the BDHS 2004 which shifted recorded percentage levels from 11% in the BDHS 2004 to 17% in the BDHS 2007 (see NIPORT et al. 2009:91), a very substantial elevation of over 50%. At the same time it is explicitly acknowledged in the BDHS 2007 that "Unmet need has increased across all ages, all educational groups, both urban and rural areas, and all administrative divisions" (NIPORT et al. 2009:91), with the implication that even specifically for the population of interest, the urban poor of Chittagong, Unmet Need is not as elevated as the programme theory supposes.

Aside from issue of highly the questionable definition of Unmet Need which by virtue of being a definition definitely applies also to the population of interest, based simply on the argument that if the programme theory has an unrealistically high understanding of Unmet Need levels and has set targets for its reduction accordingly with the expectation that achieving these targets will yield a certain level of fertility reduction is very unlikely. If we take purely for the purposes of illustrative example the assertion of the BDHS Policy Brief that Unmet Needs are probably already at the target levels (across Bangladesh and without assuming that this particular level might apply

to the population of interest), the same inputs required to reduce Unmet Need from 17% to 9%, a difference of 8%, would not likely reduce Unmet Need from 9% to 1%, and the reduction therefore in fertility from the same inputs would not be that which is anticipated.

For this reason therefore it is highly implausible that the programme will achieve its anticipated reductions in fertility through efforts to address Unmet Need in the population of interest.

With regards to the programme's other two priorities of reducing the Discontinuation Rate and increasing the share of LAPMs as a proportion of CPR, these two priorities are essentially a single priority.

The programme theory emphasises "the clear need for a shift from short-term methods to long acting and permanent methods (LAPM)" (MOHFW 2011a:12). This shift is not expected to arise through increases in the adoption of LAPMs by new contraceptors, but rather existing contraceptors using temporary methods because "the current pattern of temporary contraceptive use…is reaching saturation…but other individual methods do not even account for 10% each" (MOHFW 2011b:188) and "with two decades of reproductive life to avoid unwanted pregnancies…the proportions of couples relying on long-acting or permanent FP methods (IUD, implants, male or female sterilization) remains very low (less than 15%)" (MOHFW 2011b:188). The shift therefore from temporary methods to LAPMs will obviously reduce the Discontinuation Rate.

Couples using temporary methods can reasonably be classified into two groups: effective contraceptors who will not Discontinue use under normal circumstances, and non-effective contraceptors who will have the tendency to Discontinue use, for whatever reason. A shift from the use of temporary methods to LAPMs for couples in the group of effective contraceptors would have relatively minor consequence for Discontinuation, the aversion of unwanted pregnancy and therefore for the reduction of fertility. The major impact in terms of reducing the Discontinuation Rate, averting unwanted pregnancy and therefore for a reduction in fertility would occur with a shift from temporary methods to LAPMs by couples in the group of non-effective contraceptors. This advantage of LAPMs is clear from the programme theory's

perspective. The question the programme theory fails to answer however is why a couple who are prone to Discontinue even the use of temporary methods, for whatever reason, would freely want to adopt LAPMs?

Based on this line of argument and the understanding that the programme's promotion of LAPMs in the population of interest will remain ethical and non-coercive, it is highly implausible that the programme will achieve its anticipated reductions in fertility through efforts to address Discontinuation and the promotion of LAPMs.

In summary, with regards to the second question of the study it is concluded that family planning programmatic interventions in their current form which prioritise the key targets of reducing Unmet Need, reducing the Discontinuation Rate and increasing the proportion of LAPMs as a share of the CPR will not likely succeed in reducing the fertility outcomes of the urban poor in Chittagong.

6.2.6 - Recommendations

Having arrived at the conclusion with regards to the second question of the study that the family planning programme in its current form will not likely succeed in reducing the fertility outcomes of the urban poor in Chittagong, it becomes appropriate now to provide some recommendations.

It may be noted that whilst some recommendations are directly geared towards family planning policy and programming, one recommendation in particular extends beyond this domain into the realms of developmental policy in general.

It may be recalled that the comparison of the family planning theory and the Social Norms explanation, undertaken with the suggestive support of national trends in the recent BDHS, was considered insufficient to provide the credible basis for a plausible assessment of the programme's likelihood of success in reducing the fertility of the population of interest. This assessment was therefore arrived at exclusively on the basis of the discovery that the programme theory's own internal rationale is highly implausible and its foundations in relation to both problem identification and priority setting highly questionable.

The recommendations presented here are based on the alignment of the Social Norms explanation, trends in national data and the reasons identified for the unlikely success of the family planning programme in its current form. The alignment of all three sources of knowledge appropriately organised in terms of the RWA framework is considered to provide a sufficiently credible basis upon which to formulate recommendations for family planning policy and programming, as well as beyond, whilst acknowledging that further research is required both to assess the proportion of the population of interest to which the Social Norms explanation is relevant as well as to evaluate the recommendations. The recommendations therefore should be viewed not so much as readily actionable policy or programming recommendations but rather recommendations as to the specific areas of focus that further evidence gathering and research efforts should be trained upon with a view to assessing whether the recommendations are appropriate and actionable.

Recommendations for Family Planning Policy and Programming in Bangladesh

Because family planning policy and programming in terms of the RWA framework relates to Willingness and Ability only, recommendations for the family planning domain are framed in relation to these two conditions.

Increasing the Willingness to limit fertility and use modern family planning methods within the urban poor of Chittagong

One of the key attractions of LAPMs from a population control perspective is based on the idea that implementation per couple is a one-time procedure. If however, serious consideration is given to the potential scale and potential seriousness of possible adverse health impacts in their widespread use, and the possible consequences of these impacts on health system burden and economic development as a whole due to issues such as employee absences, the promotion of LAPMs presents the appearance of a dangerously high-risk and short-term strategy.

Given that the Social Norms explanation suggests that couples are effective contraceptors, an alternative that warrants serious investigation is that of combining

the traditional method of periodic abstinence with modern technological advancements that offer the ability to accurately pinpoint periods of ovulation through simple and reusable devices, a form of natural contraception commonly referred to as fertility awareness-based methods (FAB) (Freundl, Frank-Herrmann & Gnoth 2010; Freundl, Sivin & Batár 2010). Some studies indicate an extremely high level of contraceptive efficacy is possible in both developed and developing country contexts, with some these methods even in typical use (in contrast to perfect use) indicated as being of similar efficacy to many modern conventional contraceptive methods, including Depo Provera (Evans 2012; Frank-Herrmann et al. 2007; Hilgers & Stanford 1998; Manhart et al. 2013; Pallone & Bergus 2009).

In Bangladesh despite decades of programmatic effort in the promotion of modern methods, periodic abstinence remains the second most popular of all (modern and traditional) contraceptive methods amongst married women aged 35-49 (NIPORT et al. 2013:84). This age group of women have typically attained their desired fertility outcomes and are clearly Ready, Willing and Able to limit their fertility in order to avoid unwanted pregnancies through the use of this method. Increasing its efficacy then simply requires the supplementation of the existing method with training and FAB devices. Like LAPMs, FABs require no ongoing supply of commodities but unlike LAPMs they avoid side effects.

This route to lower fertility in the population of interest requires further investigation because even though end-user control, and therefore error, will remain in the use of FABs, programmatic intervention to produce a high level of Willingness is likely to be much more fruitful with FABs than with LAPMs. This would appear to be particularly true of high fertility social networks in which couples anyway have a low level of Readiness to limit fertility. Just a few adverse experiences with LAPMs in a network is likely to shut it down to the further promotion of any method type because for these couples, facing the risk of possibly adding one or two more children to an already desired large number in order to avoid the 'confirmed' side effects of LAPMs their trusted network members have warned them against is not going to be a difficult choice for them to make. Ultimately, the overall efficacy of a method in a population is a function of both method efficacy and method take-up.

Increasing the Ability to acquire modern family planning methods within the urban poor of Chittagong

The Social Norms explanation suggests that the subjective price of contraception is the key aspect of relevance to Ability. The family planning programme has a current budget of $183.5 million specifically earmarked for the physical equipment and consumables required in achieving 2016 LAPM targets such as 1.5 million male sterilisations, 2.5 million IUD insertions and 2 million implant insertions (MOHFW 2011b:193). This budget alone, which excludes the additional costs of field service delivery (see MOHFW 2011b:194) equates to a cost per LAPM acceptor of $30, assuming all targets are met.

An assessment of the relative costs of FAB commodities would depend on the particular type of FAB in question. Whilst user training is required for all FABs, devices range from simple coloured beads representing days to more sophisticated saliva, mucus or basal temperature monitors all of which are used to keep track of the ovulation cycle (see Bekele & Fantahun 2009; Frundl Frank-Hermann 2010). Given that in the Social Norms explanation the formulation of Willingness is based on individual learning through social networks rather than on direct exposure to family planning programming and N.G.O interventions, the transfer and diffusion of the knowledge required for the effective use of these methods, and the reduction of training costs, would be facilitated by training certain key members of each identified social network.

Nevertheless, the programmatic promotion of virtually any form of contraception will entail subsidies to lower the price to the end-user (see Easterlin 1975:56). In calculating costs from a programming perspective the issue is not one of cost per notional acceptor assuming all targets are met, but rather the cost per unwanted birth averted, which again highlights the importance of both method efficacy as well as method take-up in a population.

Recommendations Extending Beyond Immediate Family Planning Concerns

Because in terms of the RWA framework, recommendations relating to Readiness fall beyond the scope of immediate family planning concerns, the recommendation put forward here, whilst remaining focused on fertility reduction, is more potentially relevant to broader developmental policy in Bangladesh.

Increasing the Readiness to limit fertility within the urban poor of Chittagong

Whilst the Readiness to limit fertility falls outside of the usual domain of immediate concern to family planning policy and programming, it is highly relevant to fertility levels.

The Social Norms explanation suggests that within the urban poor of Chittagong, for the relevant couple type identified in this study, there are two types of social networks, a high-fertility network and a low-fertility network that are based on emotional ties between members. Both these networks exist alongside each other in the same neighbourhoods. Fertility preferences are formulated in both networks on the perception of social approval to be garnered through different fertility outcomes. Perceptions of any quantity/quality trade-offs as far as children are concerned are therefore based on social rather than economic calculation. Couples belonging to both types of network are effective contraceptors once their fertility targets have been satisfied. For this group of couples Unmet Need and Discontinuations are not an issue waiting to be satisfied by supply side programming efforts. If LAPMs are taken up by these couples in the population of interest, they will only be taken up once they have already attained their targeted fertility outcomes, whether high or low. Since in such circumstances these couples are effective contraceptors anyway, the reduction of fertility through the avoidance of unwanted pregnancies would be marginal.

A broader developmental policy beyond the remit of family planning might incorporate a fertility-demand driven policy which would focus on the development of an environment and set of circumstances in which couples located in high fertility networks feel the need to reassess their Readiness for a high fertility outcome. Bearing in mind that in the Social Norms explanation this Readiness is formulated in response

to perceptions of social approval to be gained through fertility outcomes, a policy seeking to effect change would seek to present an alternative, conflicting, route to social approval which entails a low fertility outcome. Such a route is presented by the development of viable opportunities for the social and economic mobility of the children of the poor, the availing of which most probably has to involve a combination of public sector subsidy and parental economic sacrifice. In future years due to a combination of population growth and the rural-urban migration of the poor, the proportion of the urban population living in slums is expected to expand dramatically, creating new and serious challenges for urban health and education systems. These challenges will demand a huge expansion in the number of personnel engaged in both sectors. The provision of realistic opportunities through education for the children of the urban poor to progress to relatively advanced levels of seniority within these sectors would appear to serve the dual advantage first of providing an alternative route for parents to gain social approval through their children's accomplishments, albeit at the compromise of having fewer children in order to be able afford the (already subsidised) cost of propelling children as far as they can go up the socioeconomic ladder, and second simultaneously preparing the sheer number of personnel that will be required for the challenges ahead.

Summary of Recommendations

With regards to family planning policy and programming, not enough is known in terms of how, in the population of interest, FABs as a potential alternative to LAPMs might be received, the costs that would be involved in their promotion and provision, or what their efficacy might be under typical use. Due to the plausible prospects for the take-up of FABs, the recommendation of this study in relation to family planning policy and programming is that research into the possible appropriateness and viability of FABs as an alternative form of contraception to LAPMs should be undertaken.

With regards to broader developmental policy, beyond the remit of immediate family planning concerns, the recommendation of this study is for the need to explore the potential for fertility reduction in the population of interest through a development-driven fertility demand reduction strategy focusing on the provision of realistic

opportunities for the socioeconomic mobility of the children of the poor, particularly in relation to employment and advancement in the health and education sectors. It might be noted that even over ten years ago the average woman in Bangladesh had knowledge of 7.6 different contraceptive methods (NIPORT et al. 2005:63). The time may have come in Bangladesh to move away from a supply side family planning focus towards development-driven fertility demand reduction in order to achieve further declines in fertility.

Chapter 7. Conclusion

This study set out to develop an explanation for fertility outcomes within the urban poor of Chittagong and finds that within this population of interest there is a type of couple for whom the influence of social norms plays a major role in relation to their fertility outcomes.

This chapter is organised as follows: first, the motivations underlying the study are summarised; second, empirical findings are presented with respect to each of the two research questions of the study; third, the theoretical implications of the findings are highlighted; fourth, policy and programme implications are presented; fifth, recommendations for future research are presented; and finally the potential contribution of the new small-N comparative approach developed in this study for the field of economics more generally is highlighted.

The motivation for this study was jolted into existence when initial curiosity about Bangladesh's remarkable national fertility decline over recent decades (see Jain & Ross 2012) gave way to the understanding that despite this, the country this century faces the potentially devastating consequences of a looming demographic crises which would see a projected increase in the current estimated population of 150 million to over 250 million and a trebling of the urban population to over 100 million, primarily due to rural-urban migration by the poor who usually settle in slums when they arrive in urban areas (CUS et al. 2006; Streatfield & Karar 2008). Currently over one third of the urban population in Bangladesh consists of slum inhabitants, and because their number doubles every ten years, which is twice the rate of increase when compared to the overall urban population growth, over the coming years increasingly large proportions of the urban population will be constituted by slum inhabitants (MOHFW 2011a; MOHFW 2011b). The potential magnitude of the challenges ahead for social, economic and political stability in the country requires no elaborate emphasis.

The family planning programme has prioritised the remaining high fertility regions of Chittagong and Sylhet Bangladesh for fertility reduction interventions, and has set highly ambitious targets in this regard (MEASURE DHS 2013; MOHFW 2011a; MOHFW 2011b). However, neither of the two dominant explanations for the national fertility decline (see Caldwell et al. 1999; Cleland et al. 1994) can offer an explanation for the

ongoing relatively high fertility rates in Chittagong and Sylhet beyond a 'black box' cultural explanation (see Cleland et al. 1994:139-140; Mannan & Beaujot 2006:57) which posits that fertility decline was impeded in these regions due to a culture of conservatism and tradition, without venturing any details as to which particular aspects of culture are relevant and how or why these are relevant to fertility in these divisions. Very little research into the social and economic determinants of fertility behaviour in these high fertility regions has ever taken place (see Islam et al. 2010:707).

Of the two divisions, because Chittagong has three times the population of Sylhet (MEASURE DHS 2013:1), the poorest in Chittagong have the highest fertility rates (Islam & Nesa 2009), and given the exponential expansion of the slum population across Bangladesh, it is the urban poor of Chittagong who constitute the population of interest most relevant for the future efficacy of family planning programmatic efforts in Bangladesh.

With the future challenges the country is set to face apparently resting to a large extent on the success of the family planning programme, it became an important mission to contribute towards filling the gap in knowledge by prising open the 'black box' of fertility within the urban poor of Chittagong with a view to informing family planning programmatic interventions.

The first research question of the study was formulated as:

Q1. What are the major determinants and underlying causal mechanisms of differing fertility outcomes within the urban poor of Chittagong?

The study employs the RWA framework as elaborated by Lesthaeghe & Vanderhoeft (2001) to find for the relevant couple type identified within the population of interest that the major determinant of differing fertility outcomes is the influence of social norms on the formulation of fertility preferences by the couple. These fertility preferences can then dynamically adjust for both husband and wife depending on the importance of sex composition and whether it is being realised in addition to dynamic downward adjustments in fertility preferences which can occur for the wife in response to the experience of miscarriages or stillbirths, provided the importance

given by her to sex composition is not high. In terms of the RWA framework the couple's initial fertility preferences subject to dynamic adjustment constitute the mechanism condition Readiness to limit fertility.

The wife's normative acceptability of the principle of fertility limitation and her disposition towards the use of modern family planning methods is found to be based on the fertility outcome norm of her peer group based on emotional ties. In terms of the RWA framework this condition constitutes the mechanism condition Willingness to limit fertility and use modern family planning methods.

The wife's ability to acquire modern family planning methods is based on her subjective cost assessment in this regard and constitutes in the RWA framework the mechanism condition Ability to acquire modern family planning methods.

The study finds therefore for the identified couple type within the population of interest that the major determinant is the influence of social norms which tends to produce initial fertility preferences. The mechanism Readiness, constituted by these initial preferences but subject to dynamic adjustment then combines with the mechanism Willingness and the mechanism Ability, with the combination of all three mechanisms then producing the tendency for a low or high fertility outcome.

The second research question of the study was formulated as:

Q2. How likely will family planning programmatic interventions succeed in reducing the fertility outcomes of the urban poor in Chittagong?

An assessment of the plausibility of the programme theory in achieving its intended outcome of reducing fertility in the population of interest examined the three key priorities of the family planning programme theory: reducing Unmet Need, reducing Discontinuations and increasing the share of LAPMs.

With regards to the reduction of Unmet Need the study finds that the programme theory's understanding of existing levels were based entirely on data which were subject to an elevation of the recorded levels of Unmet Need due to changes in its definition (see NIPORT et al. 2009:91), and it is upon this elevated level of Unmet Need that problem identification and target setting occurred (see MOHFW 2011b:189). For this reason the study finds it unlikely that the programme will achieve its intended

outcome of fertility reduction through current interventions to reduce Unmet Need in the population of interest.

The programme's other two key priorities of reducing the Discontinuation Rate and increasing the share of LAPMs as a proportion of CPR are essentially a single priority due to the programme theory's emphasis on reducing the Discontinuation Rate by shifting temporary method users towards the adoption of LAPMs (see MOHFW 2011a:12). The programme theory fails to provide any rationale whatsoever for the expectation, upon which this strategy of fertility reduction is based, that users who are prone to Discontinuation even in the use of temporary methods would freely want to adopt LAPMs instead. Because it is this particular type of temporary method user who would contribute the most to a reduction in fertility outcomes if they were to adopt LAPMs, but no rationale for why they would do this is provided by the programme theory, the study therefore finds that programme interventions aimed at reducing fertility outcomes in the population of interest through efforts to address the key priority targets of Discontinuation and the promotion of LAPMs are unlikely to succeed.

The study finds therefore with regards to the second question of the study that family planning programmatic interventions in their current form will not likely succeed in achieving the intended outcome of reducing the fertility outcomes within the population of interest.

Because the methodological approach developed proceeds to arbitrate between rival theories on the basis of elimination, and the scope of the first three models incorporated into the RWA framework relate to the formulation of the fertility preferences (Readiness), the Wealth Flows theory (Caldwell 1976, 1978, 1982), Children as Security Assets theory (Cain 1978, 1981, 1982), and a range of theories related to gender, fertility and marriage bargaining, and the divorce threat model (e.g. Buss 1985; Cain et al. 1979; Manser & Brown 1980; McElroy & Horney 1981) are found not to contribute towards an explanation as to the formulation of fertility preferences in relation to the couples examined and the couple type of relevance within the population of interest.

Additionally, ideational and family planning theories (e.g. Cleland et al. 1994; Easterlin 1975; Easterlin & Crimmins 1985) upon which the fourth model of the framework was based, and which relate to the possible influence of family planning interventions on the formulation of the wife's Willingness as her normative acceptability of the principle of fertility limitation and her disposition towards the use of modern family planning methods, as well as her Ability to acquire modern family planning methods, is also found not to contribute towards an explanation in relation to the examined couples and the couple type of relevance within the population of interest with regards to the formulation of the wife's Willingness and Ability on the causal pathway to the fertility outcome.

The findings based on the Social Norms explanation as the only rival theory managing to avoid elimination and spanning the RWA framework to the fertility outcome is based on theories which emphasise the influence of social norms in the formulation of the fertility preferences as well as the use of modern family planning methods (e.g. Blake 1968; Casterline 2001; Montgomery & Casterline 1996).

The findings of the study therefore accord strongly with Montgomery and Casterline's (1996) concept of social learning in the formulation of decision making in terms of the child quantity/quality trade-off under conditions of uncertainty and Casterline's (2001) emphasis on the influence of peer groups on the adoption and use of modern contraceptive methods.

Blake's (1968) emphasis on the role of social norms in shaping the formulation of preferences not only in terms of the quantity of children but also their 'quality' however meets with a different conceptualisation of child 'quality' in the Social Norms explanation in the form of child sex composition preferences with the opposite implication for fertility outcomes. In the Social Norms explanation the pursuit of this type of child 'quality' potentially increases the fertility outcomes of couples.

Critical however is the support provided by the findings of this study for what has been referred to as the 'black box' cultural explanation for the ongoing relatively high fertility rates in the high fertility regions of Bangladesh, as posited by advocates of ideational and family planning theories (see Cleland et al. 1994:139-140; Mannan & Beaujot 2006:57).

The findings of this study suggests that within the urban poor of Chittagong, for the relevant couple type identified in this study, there are two types of social networks, a high-fertility network and a low-fertility network that are based on emotional ties between members. Both these networks exist alongside each other in the same neighbourhoods. Fertility preferences are formulated in both networks on the perception of social approval to be garnered through different fertility outcomes. Perceptions of any quantity/quality trade-offs as far as children are concerned are therefore based on social rather than economic calculation.

The findings of the study suggest that the 'black box' cultural explanation should be thought of in terms of the distribution of couples in high fertility networks and low fertility networks.

What the study may have achieved therefore is the opening up of this 'black box' explanation which was the initial motivation for the study. The resulting explanation for fertility outcomes in the study has been achieved through the context-specific conceptualisation and operationalisation of determinants and mechanisms leading to the fertility outcomes of couples with the advantage of formal specification in terms of logic for each aspect situated on the specified causal chain of the developed explanation, down even to the detail of the possible influence of still births and miscarriages on the dynamic adjustment of the wife's fertility preferences. These formulations are highly transparent and replicable, offering potentially important implications for the development of fertility theory.

This alignment between the explanation developed in the study and the 'black box' cultural explanation for the high fertility regions of Bangladesh then also serves to support the findings of the study in relation to the likelihood of success of family planning programmatic interventions in reducing fertility outcomes in the population of interest – more of the same effort trained upon the supply side of modern family planning methods, with the addition now of attempting to shift couples towards LAPMs, will not likely be successful in view of its track record to date in the high fertility regions of Bangladesh.

Instead the study suggests the recommendation for family planning policy and programming that because periodic abstinence remains the second most popular of all

(modern and traditional) contraceptive methods amongst married women aged 35-49 (NIPORT et al. 2013:84) research into the possible appropriateness and viability of FABs which supplement this natural method of fertility regulation with devices which increase method efficacy as an alternative form of contraception to LAPMs should be undertaken, since this type of intervention appears to offer the prospect of favourable up-take in the population of interest.

With regards to policy recommendations beyond the scope of family planning concerns, it is suggested that further research is required to investigate the potential for fertility reduction in the population of interest through a development-driven fertility demand reduction strategy focusing on the provision of partly-subsidised but realistic opportunities for the socioeconomic mobility of the children of the poor, as a possible means to divert the influence of social norms on issues of fertility from the current emphasis based on the quantity and sex composition of children with its implications for high fertility outcomes, instead towards the 'quality' of children as in the conceptualisation of Blake (1968) with its implications for low fertility outcomes.

At a broader level beyond concerns directly related to fertility, the study offers two key potential contributions to the field of economics.

First, the apparently successful first application of new small-N comparative approach developed in this study in the empirically based investigation of different theoretical assumption in relation to situations, motivations, incentives and decisions of individuals at the micro-foundational level of analysis suggests its potential for application in the broader field of economics for similar investigations. This potential is likely to be all the more useful given the potential of the approach for integration with large-N quantitative approaches.

Second, through the successful employment of the RWA framework as elaborated by Lesthaeghe & Vanderhoeft (2001), the study demonstrates a possible route towards cross-discipline theoretical analysis and fertilisation.

Overall, whilst the study has achieved what it set out to and has successfully developed an explanation for the fertility outcomes of a type of couple within the urban poor in Chittagong which aligns with the only current explanation of 'cultural' factors but

provides the required depth of explanation to enable insight, the methodological development that has occurred in order to produce this explanation yields a potential contribution beyond the immediate scope of the study.

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APPENDIX

The concept logical engineering procedure for each condition is presented in the tables below.

It may be noted that the tables contain the original English version of the questions that were asked of the respondents organised by model and condition, the closed answer options, the responses by respondents in the form of raw data and the logical engineering of this data (under the heading of coding rule) alongside each question.

To facilitate an understanding of the workings of concept logical engineering, some introductory notes on the procedure are provided here.

Concept logical engineering aims to operationalise post-examination condition concepts by bringing each sub-concept of each floating condition for both positive and negative cases into hypothesis-compliant alignment with the value of the ultimate framework level outcome for the cases, the Fertility Outcome, in order to produce an ultimate operationalisation for each condition (at the top of the layers) which has a value assigned to the condition that is in alignment with hypothetical expectations, across as many cases as possible, subject to the principles discussed in Chapter 3: Methodology in the section on the formulation of CMA. It might be remembered that this process involves both positive and negative cases, and their counterfactual corroboration.

Concept logical engineering proceeds by working its way up the data table from the values assigned to each indicator, one sub-concept at a time within a particular layer of sub-concepts, and one layer at a time. Due to this process, the ultimate operationalisation of the condition is always presented at the top of the table, and is explicit as to how it is formulated in relation to each sub-concept in the next layer of sub-concepts down. The same principle applies to all sub-concepts in all the layers below, down to the indicators. The ultimate operationalisation of each condition can therefore be traced right back down to the specific questions that were asked and the responses that were provided by each of the respondents.

The reader might be assisted in following the concept logical engineering results presented in the relevant tables for each condition in this chapter with the following table which summarises the ordering of the cases as they are in the results tables, by religious affiliation and fertility outcome.

Table A5.1 **Case ordering by Fertility Outcome and Religion**

Case ID	**44**	**28**	**33**	**60**	**22**	**12**	**50**	**8**
Fertility Outcome	High= (0)	Low(1)	High= (0)	Low(1)	High= (0)	Low(1)	High= (0)	Low(1)
Religion	Islam				Hinduism			

Where there is potentially a reasonable compatibility of certain questions with those in secondary data, this is indicated in the tables by 'SD Linkage', specifying the data source as either BDHS 2007 (NIPORT et al. 2009) and/or Bangladesh MICS3 2006 (BBS-UNICEF 2007). This compatibility for most linkages is related to the scoping of the same case type of respondents examined in this study to those instances in the secondary data.

Husband/Wife questionnaire indicates which questionnaire the question and responses noted, {UK} or {DK} denotes the response of unknown or don't know by the respondent. Data notes indicate a certain treatment of the raw data where applicable.

Table A5.2

Model 1: Wealth Flows
Condition 1: Couple Nucleation

Condition:	**Conceptualisation:**	**Question Number**		**Question:**	**Answer Options & Logical Engineering:**	**Case ID:**							
		M1,				**44**	**28**	**33**	**60**	**22**	**12**	**50**	**8**
Couple Nucleation					<u>Couple Nucleation:</u> Present(1) Partial(--) Absent(0) <u>Coding rule:</u> 1) IF Residential Nucleation = Present(1) AND Employment Nucleation = Present(1) THEN Couple Nucleation = Present(1) 2) IF Residential Nucleation = Absent(0) AND Employment Nucleation = Absent(0) THEN Couple Nucleation = Absent(0) 3) ELSE Couple Nucleation = Partial(--)	0	1	--	--	--	0	--	1
		1)		During your marriage until your last successful childbirth:									

	Residential Nucleation		a)	..who did you and your wife mostly live with? (Husband questionnaire)	<u>Residential Nucleation:</u> Present(1) Absent(0) <u>Answer options (one):</u> 1. Your parents/mother/father 2. Alone as a couple 3. Other relatives (note): <u>Coding rule:</u> 1) IF Option {2.} THEN Residential Nucleation = Present(1) 2) ELSE Residential Nucleation = Absent(0)	{1.} 0	{2.} 1	{2.} 1	{2.} 1	{2.} 1	{1.} 0	{2.} 1	{2.} 1
	Employment Nucleation		b)	..did either you or your wife work mostly for relatives or non-relatives? (Husband questionnaire)	<u>Employment Nucleation:</u> Present(1) Absent(0) <u>Answer options (one):</u> 1. Relatives 2. Non-relatives <u>Coding rule:</u> 1) IF Option {2.} THEN Employment Nucleation = Present(1) 2) ELSE Employment Nucleation = Absent(0)	{1.} 0	{2.} 1	{1.} 0	{1.} 0	{1.} 0	{1.} 0	{1.} 0	{2.) 1

Table A5.3

Model 1: Wealth Flows
Condition 2: Religiosity

Condition:	**Conceptualisation:**	**Question Number**		**Question:**	**Answer Options & Logical Engineering:**	**Case ID & Data:**							
		M1,				**44**	**28**	**33**	**60**	**22**	**12**	**50**	**8**
Religiosity					Religiosity: Low(1) High(0) Coding rule: NOT CODED - see concept logical engineering notes.								
		2)		During your marriage until your last successful childbirth:									
	Purdah based dress code practices		a)	..what kind of dress code did you mostly adopt when going out in public? (Wife questionnaire)	Purdah: Low(1) NA(--) High(0) Answer options (one): 1. Face covering burka 2. Hijab 3. Head covered with shawl 4. Head covered with light scarf 5. Shoulders covered with shawl 6. Shoulders covered with light scarf 7. Neither head nor shoulders covered	{1.} 0	{3.} 1	{1.} 0	{3.} 1	{4.} --	{4.} --	{4.} --	{4.} --

					Coding rule: 1) For Muslims only, IF Ordinal Options {3.} to {7.} THEN Purdah = Low(1) ELSE Purdah = High(0) 2) For Hindus only, FOR ANY option Purdah = NA(--)								
	Husband's adherence to religious obligations		b)	..how many times a week did you pray? (Husband questionnaire)	Husband's Religious Adherence: Low(1) High(0) Answer options: Number per week: Coding rule: 1) IF Number per week (performed) ÷ obligatory number per week is < 0.5 THEN Husband's Religious Adherence = Low(1) 2) IF Number per week (performed) ÷ obligatory number per week ≥ 0.5 THEN Husband's Religious Adherence = High(0)	{17.5/ 35 = 0.5} 0	{1/ 35 = 0} 1	{35/ 35 =1} 0	{17.5/ 35 =0.5} 0	{14/ 21 =0.7} 0	{7/ 21 =0.3} 1	{21/ 21 =1} 0	{7/ 21 =0.3} 1

					Data notes: 1) The obligatory number of prayers per week for Muslims and Hindus is 35 and 21 respectively. 2) Husbands 44 and 60 prayed 2 to 3 times daily which equates to 14 to 21 times per week, and therefore a midpoint of 17.5 is used in the calculation.								
	Wife's adherence to religious obligations		c)	..how many times a week did you pray? (Wife questionnaire)	Wife's Religious Adherence: Low(1) High(0) Answer options: Number per week: Coding rule: 1) IF Number per week performed ÷ obligatory number per week < 0.5 THEN Wife's Religious Adherence = Low(1) 2) IF Number per week performed ÷ obligatory number per week ≥ 0.5 THEN Wife's Religious Adherence = High(0)	{0/ 35 =0} 1	{2.5/ 35 =0} 1	{2/ 35 =0} 1	{35/ 35 =1} 0	{21/ 21 =1} 0	{21/ 21 =1} 0	{14/ 21 =0.7} 0	{0/ 21 =0} 1

					Data Notes: 1) The obligatory number of prayers per week for Muslims and Hindus is 35 and 21 respectively. 2) Wife 28 prayed 2 to 3 times a week, and therefore a midpoint of 2.5 is used in the calculation.								
	Husband's religiosity in health seeking behaviour		d)	..whenever one of your children was seriously ill, which of the following did you usually do? (Husband questionnaire)	Husband's Religious Health Seeking: Absent(1) Present(0) Answer options (one+): 1. Animal sacrifice 2. Charity 3. Blessing from religious person 4. Extra prayers 5. Other religious activity (note): 6. None Coding rule: 1) IF Option {6.} THEN Husband's Religious Health Seeking = Absent(1) 2) ELSE Husband's Religious Health Seeking = Present(0)	{1., 2., 3., 4.} 0	{1., 2., 4.} 0	{1., 2.} 0	{2., 4.} 0	{2., 4.} 0	{4.} 0	{3.} 0	{3., 4.} 0

	Wife's religiosity in health seeking behaviour		e)	..whenever one of your children was seriously ill, which of the following did you usually do? (Wife questionnaire)	<u>Wife's Religious Health Seeking:</u> Absent(1) Present(0) <u>Answer options (one+):</u> 1. Animal sacrifice 2. Charity 3. Blessing from religious person 4. Extra prayers 5. Other religious activity (note): 6. None <u>Coding rule:</u> 1) IF Option {6.} THEN Wife's Religious Health Seeking = Absent(1) 2) ELSE Wife's Religious Health Seeking = Present(0)	{1., 2., 3., 4.} 0	{4.} 0	{2., 3., 4.} 0	{1., 2., 3., 4.} 0	{2., 4.} 0	{4.} 0	{4.} 0	{4.} 0
			f)	Do you believe a child brings its own sustenace from God when it is born? (Husband questionnaire Sup1)	<u>Belief in provisioning for children by God:</u> Absent (1) Present(0) <u>Answer options (one):</u> 1. Yes 2. No	{1.} 0	{1.} 0	{1.} 0	{1.} 0	{1.} 0	{1.} 0	{1.} 0	{1.} 0

					<u>Coding rule:</u> 1) IF Option {2.} THEN Belief in provisioning for children by God = Absent(1) 2) ELSE Belief in provisioning for children by God = Present(0)								
			g)	Do you believe a child brings its own sustenace from God when it is born? (Wife questionnaire Sup1)	<u>Belief in provisioning for children by God:</u> Absent (1) Present(0) <u>Answer options (one):</u> 1. Yes 2. No <u>Coding rule:</u> 1) IF Option {2.} THEN Belief in provisioning for children by God = Absent(1) 2) ELSE Belief in provisioning for children by God = Present(0)	{1.} 0	{1.} 0	{1.} 0	{1.} 0	{1.} 0	{1.} 0	{1.} 0	{1.} 0

Table A5.4

Model 1: Wealth Flows
Condition 3: Wealth Flow Motivations

Condition:	**Conceptual-isation:**	**Q. No.**		**Question:**	**Answer Options & Logical Engineering:**	**Case ID:**							
		M 1,				**44**	**28**	**33**	**60**	**22**	**12**	**50**	**8**
Upward wealth flow motivations		3)			Wealth Flow Motivations: Low(1) Indeterminate(--) High(0) Coding rule: 1) Wealth Flow Motivations ( ) = Political Wealth Flows ( )	0	1	--	--	0	--	1	1
	Political wealth flows:		a)		Political Wealth Flows: Low(1) Medium(--) High(0) Coding rule: 1) IF In-law-derived Flows From Sons = Low(1) AND In-law-derived Flows From Daughters = Low(1) THEN Political Wealth Flows = Low(1)	0	1	--	--	0	--	1	1

					2) IF In-law-derived Flows From Sons = High(0) AND In-law-derived Flows From Daughters = High(0) THEN Political Wealth Flows = High(0) 3) ELSE Political Wealth Flows = Medium(--)								
	In-law-derived wealth flows from sons		i.	In your opinion what is the ideal number of brothers and sisters for a daughter in-law to have? (Husband questionnaire)	<u>In-law-derived Flows From Sons:</u> Low(1) High(0) <u>Answer options (both 1. & 2., or else 3.):</u> 1. Ideal number of brothers: 2. Ideal number of sisters: 3. Don't know {DK} <u>Coding rule:</u> 1) IF Ideal number of brothers + Ideal number of sisters ≤ 2 or {DK} THEN In-law-derived Flows From Sons = Low(1)	{2+1 = 3} 0	{DK} 1	{1+1 = 2} 1	{2+2 = 4} 0	{2.5 +2 = 4.5} 0	{1+1 = 2} 1	{1+1 = 2} 1	{1+1 = 2} 1

					2) IF Ideal number of brothers + Ideal number of sisters ≥ 3 THEN In-law-derived Flows From Sons = High(0) <u>Data notes:</u> 1) H22 stated an ideal of 2 to 3 brothers, noted as 2.5								
			/i	Why?	<u>In-law-derived Flows From Sons (why):</u> Low(1) High(0) <u>Coding rule:</u> 1) IF In-law-derived flows not implied THEN In-law-derived Flows From Sons (why) = Low(1) 2) ELSE In-law-derived Flows From Sons (why) = High(0)	Extra care for son 1	It depends on Allah 1	Fewer problems 1	Small family 1	Good-problem free 1	Small family 1	Safe, no problems for children born 1	Good-small family 1
	In-law-derived wealth flows from daughters		ii.	In your opinion what is the ideal number of brothers and sisters for a son in-law to have?	<u>In-law-derived Flows From Daughters:</u> Low(1) NA(--) High(0)	{3+1-2 = 4.5} 0	{DK} 1	{2+1 = 3} 0	{NA} --	{3-4+2 = 5.5} 0	{NA} --	{0+2 = 2} 1	{1+1 = 2} 1

				(Husband questionnaire)	<u>Answer options (both 1. & 2., or else 3.):</u> 1. Ideal number of brothers: 2. Ideal number of sisters: 3. Don't know {DK} <u>Additional option noted:</u> Non-applicable {NA} noted when the respondent did not have a daughter <u>Coding rule:</u> 1) IF Ideal number of brothers + Ideal number of sisters ≤ 2 or {DK} THEN In-law-derived Flows From Daughters = Low(1) 2) IF Ideal number of brothers + Ideal number of sisters ≥ 3 THEN In-law-derived Flows From Daughters = High(0) 3) ELSE In-law-derived Flows From Daughters = NA(--)								

					Data notes: 1) H44 stated an ideal of 1 to 2 sisters, noted as 1.5 2) H22 stated an ideal of 3 to 4 brothers, noted as 3.5								
			/i	Why?	In-law-derived Flows From Daughters (why): Low(1) NA(--) High(0) Additional option noted: Non-applicable {NA} noted when the respondent did not have a daughter Coding rule: 1) IF In-law-derived flows not implied THEN In-law-derived Flows From Daughters (why) = Low(1) 2) IF In-law-derived flows implied THEN In-law-derived Flows From Daughters (why) = High(0) 3) ELSE In-law-derived Flows From Daughters (why) = NA(--)	Happy daughter 1	It depends on Allah 1	Small and nice family 1	{NA} --	Good life and good food for daughter 1	{NA} --	One son (inlaw), so no problems 1	Happy daughter 1

	Economic wealth flows:		b)		Economic Wealth Flows: Low(1) High(0) Coding rule: 1) Economic Wealth Flows ( ) = Altruistic Incentives For Sons ( )	0	0	0	1	1	0	1	1
	Altruistic parental incentives for sons		i.	Regarding your sons, which statement is the most accurate? Income given by our sons to me and my wife would usually be: (Husband questionnaire)	Altruistic Incentives For Sons: High(1) Low(0) Answer options (one): 1. Higher before their marriage 2. Higher after their marriage 3. Similar before and after their marriage 4. No major income flows have been received or are expected in the future Coding rule: 1) IF Option {1.} or {4.} THEN Altruistic Incentives For Sons = High(1)	{3.} 0	{3.} 0	{3.} 0	{1.} 1	{1.} 1	{3.} 0	{1.} 1	{1.} 1

					2) IF Option {2.} or {3.} THEN Altruistic Incentives For Sons = Low(0)								
	Mitigation of son default risk		ii.	For your sons, what in your opinion would be the ideal form of marriage? (Husband questionnaire)	<u>Mitigation:</u> Low(1) NA(--) High(0) <u>Answer options (one):</u> 1. Unrelated 2. With a relative 3. Exchange <u>Coding rule:</u> NOT CODED – marriage with relatives and exchange marriages were found to be virtually non-existent for both Muslim and Hindu communities, almost taboo, hence there is no variation across respondents in their response to this question.	{1.}	{1.}	{1.}	{1.}	{1.}	{1.}	{1.}	{1.}

			/i.	Why?	<u>Mitigation (why):</u> Low(1) NA(--) High(0) <u>Coding rule:</u> 1) IF Mitigation not implied THEN Mitigation (why) = Low(1) 2) IF Mitigation implied THEN Mitigation (why) = High(0) 3) ELSE Mitigation (why) = NA(--) <u>Data notes:</u> 1) H28 & H22 - the implication of the response is 'fewer problems'.	Extra care for sons 1	Fewer problems 1	Good, good offspring because son would marry a woman from a good, respectable family 1	Expand number of relatives 1	Fewer problems 1	Skipp-ed --	Unrelated inlaws will seriously consider our opinions/ Requests 1	Extra care for son 1
	Altruistic parental incentives for daughters		iii.	For your daughters, what in your opinion would be the ideal form of marriage? (Husband questionnaire)	<u>Altruistic Incentives For Daughters:</u> High(1) NA(--) Low(0) <u>Answer options (one):</u> 1. Unrelated 2. With a relative 3. Exchange <u>Additional option noted:</u> Non-applicable {NA} noted	{1.}	{1.}	{1.}	{NA}	{1.}	{NA}	{1.}	{1.}

					when the respondent did not have a daughter <u>Coding rule:</u> NOT CODED – marriage with relatives and exchange marriages were virtually non-existent, see bii above.								
			/i	Why?	<u>Altruistic Incentives For Daughters (why):</u> High(1) NA(----) Low(0) <u>Additional option noted:</u> Non-applicable {NA} noted when the respondent did not have a daughter <u>Coding rule:</u> 1) IF Parental flows not implied THEN Altruistic Incentives For Daughters (why) = High(1) 2) IF Parental flows implied THEN Altruistic Incentives For Daughters (why) = Low(0) 3) ELSE Altruistic Incentives For Daughters (why) = NA(--)	Maintain respect/ honour 0	Good 1	No problems 1	{NA} --	Fewer arguments 1	{NA} --	Develop new strong family relations 0	Fewer problems 1

Table A5.5

Model 1: Wealth Flows
Condition 4/Outcome 1H: Husband's Fertility Demand

Condition:	**Conceptual-isation:**	**Q. No.**		**Question:**	**Answer Options & Logical Engineering:**	**Case ID:**							
		M 1,				**44**	**28**	**33**	**60**	**22**	**12**	**50**	**8**
Husband's Fertility Demand					Husband's Fertility Demand: Low(1) Medium(--) High(0) Coding rule: 1) IF Dynamic S/D Preference Based Fertility Demand = Present(0) THEN Husband's Fertility Demand = High(0) 2) ELSE Husband's Fertility Demand ( ) = Demand At Start( )	0	1	0	1	1	1	0	1
		4)											
	Quantity and sex composition of children demanded at start of marriage		a)	How many sons and how many daughters did you want to have when you first got married? (Husband questionnaire)	Demand At Start: Low(1) Medium(--) High(0) Answer options (both): 1. Number of sons: 2. Number of daughters:	{1.5 + 3.5 = 5} 0	{1+1 = 2} 1	{3+1 = 4} 0	{1+1 =2} 1	{1+1 = 2} 1	{Any 2 = 2} 1	{2+0 = 2} 1	{1+1 = 2} 1

					<u>Coding rule:</u> 1) IF Number of sons + Number of daughters ≤ 2 THEN Demand At Start = Low(1) 2) IF Number of sons + Number of daughters = 3 THEN Demand At Start = Medium (--) 3) IF Number of sons + Number of daughters ≥ 4 THEN Demand At Start = High(0) <u>Data notes:</u> 1) H44 stated the number of sons as 1 to 2, noted as 1.5, and the number of daughters as 3 to 4, noted as 3.5								
	Dynamic son/daughter preference based fertility demand		b)	Before each birth, were you hoping for a boy or girl to be born? (Husband questionnaire)	<u>Dynamic S/D Preference Based Fertility Demand:</u> Absent(1) Partial(--) Present(0) <u>Answer options:</u> For each birth, starting from the first: Preference (one):	{NB, NB, NB, GG} ---	{NG, -- -- still-birth, BB} --	{BB, GB, NB, GG} --	{GG still-birth, NB, NB} 1	{NB, NG, NB twins} 1	{BG neo-natal death, NB} 1	{BG, BG, BB, BG, BB} 0	{BB, GG} --

					1. Boy 2. Girl 3. No preference Actual outcome (one): 1. Boy 2. Girl Years of marriage elapsed: 1. Years: <u>Coding rule:</u> 1) IF s/d preference held for the last birth is consistent with a shift of *living* children (actual outcome excluding stillbirths and mortalities) towards the overall sex composition specified in Demand At Start (above) AND with the birth of the last child, the *living* number of children ≤ the total quantity of children specified in Demand At Start THEN Dynamic S/D Preference Based Fertility Demand = Partial(--) 2) IF the s/d preference held for the last birth is consistent with a shift of *living* children (actual outcome excluding stillbirths and mortalities) towards the overall sex								

					composition specified in Demand At Start (above) AND with the birth of the last child, the *living* number of children > the total quantity of children specified in Demand At Start THEN Dynamic S/D Preference Based Fertility Demand = Present(0) 3) ELSE Dynamic S/D Preference Based Fertility Demand = Absent(1) <u>Data Notes:</u> 1) Years of marriage elapsed is not considered reliable or relevant and so is not displayed. 2) Preference and outcome is displayed in the format {PreferenceOutcome stillbirth/mortality} with data for each child separated by a comma using the following key: Boy {B} Girl {G} No preference {N} E.g. {BG stillbirth,} indicates a Boy was preferred, a Girl was the outcome but was stillbirth 3) H28 did not specify preference or outcome for the second birth which was a stillbirth.								

	Final fertility demanded		c)	After how many children did you want no more children? (Husband questionnaire)	<u>Demand At Finish:</u> Low(1) Medium(--) High(0) <u>Answer options:</u> Number of children already born: <u>Coding rule:</u> 1) CALCULATE the Number of living children demanded at finish {= } as the difference between the Number of children already born and the number of children that were born but did not live (stillbirths, neonatal and child mortalities (see data notes below). 2) IF Number of living children demanded at finish ≤ 2 THEN Demand At Finish = Low(1) 3) IF Number of living children demanded at finish = 3 THEN Demand At Finish = Medium(--) 4) IF Number of living children demanded at finish ≥ 4 THEN Demand At Finish = High(0)	{4 living} 0	{3 born – 1 stillbirth = 2 living} 1	{3 living} --	{ 3 born – 1 stillbirth = 2 living} 1	{4 living} 0	{2 born - 1 neonatal mortality = 1 living} 1	{5 living} 0	{2 living} 1

					Data Notes: 1) In the response to this question, H28 did not included a stillbirth, whereas H12 did include a neonatal mortality (see M1, 4e and M1, 4f below). For clarity, the data noted here explictly displays Number of children already born with non-living children to calculate the Number of living children demanded at finish.								
	Unwanted fertility		d)	How many children were born after this? (Husband questionnaire)	Unwanted Fertility: Absent(1) Present(0) Answer options: Number of children born after this: Coding rule: 1) IF Number of children born after this = 0 THEN Unwanted Fertility = Absent(1) 2) ELSE Unwanted Fertility = Present(0)	{0} 1	{0} 1	{1} 0	{0} 1	{0} 1	{0} 1	{0} 1	{0} 1
	Unrealised fertility incidences		e)	Did you have any pregnancies that resulted in a miscarriage or stillbirth?	Unrealised Fertility: Present(1) Absent(0)	{2.}	{1., 1, 2nd, mother injury}	{2.}	{1., 1, 1st, un- known}	{2.}	{2.}	{2.}	{1., 1, 3rd, super- natural Incident}

				(Wife questionnaire)	Answer options (one): 1. Yes 2. No IF YES, a) Number: For each unsuccessful pregnancy: b) Birth order: c) Cause/unknown: Coding rule: 1) IF Option {1.} THEN Unrealised Fertility = Present(1) 2) ELSE Unrealised Fertility = Absent(0)	0	1	0	1	0	0	0	1
	Child/infant/ neonate mortality-driven fertility demand		f)	Has there been any death of living children? (Wife questionnaire)	C/I/N Mortalities: Absent(1) Present(0) Answer options (one): 1. Yes 2. No IF YES, a) Number of deaths: For each child who died: b) Birth order: Sex: Age at death: Cause:	{2.} 1	{2.} 1	{2.} 1	{2.} 1	{2.} 1	[1., 1, 1st, F, 6 days, under-weight refused milk} 0	{2.} 1	{2.} 1

					<u>Coding rule:</u> 1) IF Option {2.} THEN C/I/N Mortalities = Absent(1) 2) ELSE C/I/N Mortalities = Present(0)								
	Child permanent-injury driven fertility demand		g)	Has there been any permanent injury to children? (Wife questionnaire)	<u>Child Permanent Injuries:</u> Absent(1) Present(0) <u>Answer options (one):</u> 1. Yes 2. No IF YES, a) Number of children injured: For each child (only the most serious injury each): b) Birth order: Sex: Age at injury: Cause: <u>Coding rule:</u> 1) IF Option {2.} THEN Child Permanent Injuries = Absent(1) 2) ELSE Child Permanent Injuries = Present(0)	{1., 1, 2nd, M, 4yrs, burnt} 0	{2.} 1	{2.} 1	{2.} 1	{2.} 1	{2.} 1	{2.} 1	{2.} 1

Table A5.6

Model 2: Security Assets
Condition 1: Socio-economic Positioning

Condition:	**Conceptualisation:**	**Question Number**		**Question:**	**Answer Options & Logical Engineering:**	**Case ID:**							
		M2,				**44**	**28**	**33**	**60**	**22**	**12**	**50**	**8**
Socio-economic Positioning					<u>Socio-economic Positioning:</u> High(1) Medium(--) Low(0) <u>Coding rule:</u> 1) IF Quantity of Education = High(1) AND Permanent Income = High(1) THEN Socio-economic Positioning = High(1) 2) IF Quantity of Education = Low(0) AND Permanent Income = Low(0) THEN Socio-economic Positioning = Low(0) 3) ELSE Socio-economic Positioning = Medium(--)	--	1	0	--	--	0	1	--
		1)											
	Quantity of Education		a)	Is it correct that your final qualifications are those you had at the time you got married?	<u>Quantity of Education:</u> High(1) Low(0) <u>Answer options (one):</u> 1. None	{1., 0} 0	{2., 2} 1	{1., 0} 0	{3., 8} 1	{2., 2} 1	{1., 0} 0	{2., 3} 1	{1., 1} 0

				(If answer is No, this question continues: To confirm, up to what qualification level did you finally complete? If answer is Yes, data from M3, 3di is used: At the time you got married... Up to what qualification level had you completed?) (Husband questionnaire) <u>SD Linkage:</u> MICS3 2006, BDHS 2007	2. Literacy 3. Primary 4. Secondary 5. College 6. BA/BCom/BSc 7. MA/MCom/MSc 8. PhD 9. Other (note): Note - if answer is 1-5, record the highest grade/class attended (0 to 12): <u>Coding rule:</u> 1) IF Option {2.} to {9.} THEN Quantity of Education = High(1) 2) ELSE Quantity of Education = Low(1) <u>Data Notes:</u> 1) All respondents' final qualifications were those they had at the start of marriage, so data from M3,3di is used.								
	Quality of Education		b)	What type of institution did you attend for this qualification? (Data from M2, 1b if applicable, otherwise data from M3, 3dii)	<u>Quality of Education:</u> High(1) Low(0) <u>Answer options (one):</u> 1. Madrassah 2. Bengali medium institution 3. English medium institution 4. Abroad (where): 5. Other (note):	{NA}	{2.}	{NA}	{2.}	{2.}	{NA}	{2.}	{2.}

				(Husband questionnaire) <u>SD Linkage:</u> MICS3 2006, BDHS 2007	<u>Additional option noted:</u> Non-applicable {NA} noted when the respondent did not attend an institution <u>Coding rule:</u> 1) NOT CODED - All noted data for this indicator across the cases is either {NA} (no institution attended) or Option {2.} and offers insufficient variation for meaningful coding. <u>Data Notes:</u> 1) All respondents' final qualifications were those they had at the start of marriage, so data from M3,3dii is used.								
	Permanent Income		c)	How many rooms are used for sleeping in your family? <u>SD Linkage:</u> MICS3 2006, BDHS 2007	<u>Permanent Income:</u> High(1) Low(0) <u>Answer options:</u> Number: {n=} <u>Coding rule:</u> 1) IF n > 1 THEN Permanent Income = High(1) 2) ELSE Permanent Income = Low(0)	{n=2} 1	{n=2} 1	{n=1} 0	{n=1} 0	{n=1} 0	{n=1} 0	{n=2} 1	{n=2} 1

Table A5.7

Model 2: Security Assets
Condition 2: Couple Nucleation

Condition:	**Conceptualisation:**	**Question Number**		**Question:**	**Answer Options & Logical Engineering:**	**Case ID:**							
		M2,				**44**	**28**	**33**	**60**	**22**	**12**	**50**	**8**
Couple Nucleation					Couple Nucleation: Absent(1) Partial(--) Present(0) Coding rule: 1) IF Residential Nucleation = Absent(1) AND Employment Nucleation = Absent(1) THEN Couple Nucleation = Absent(1) 2) IF Residential Nucleation = Present(0) AND Employment Nucleation = Present(0) THEN Couple Nucleation = Present(0) 3) ELSE Couple Nucleation = Partial(--)	1	0	--	--	--	1	--	0
		2)		During your marriage until your last successful childbirth:									

	Residential Nucleation		a)	..who did you and your wife mostly live with? (Husband questionnaire)	<u>Residential Nucleation:</u> Absent(1) Present(0) <u>Answer options (one):</u> 1. Your parents/ mother/father 2. Alone as a couple 3. Other relatives (note): <u>Coding rule:</u> 1) IF Option {1.} or {3.} THEN Residential Nucleation = Absent(1) 2) ELSE Residential Nucleation = Present(0)	{1.} 1	{2.} 0	{2.} 0	{2.} 0	{2.} 0	{1.} 1	{2.} 0	{2.} 0
	Employment Nucleation		b)	..did either you or your wife work mostly for relatives or non-relatives? (Husband questionnaire)	<u>Employment Nucleation:</u> Absent(1) Present(0) <u>Answer options (one):</u> 1. Relatives 2. Non-relatives <u>Coding rule:</u> 1) IF Option {1.} THEN Employment Nucleation = Absent(1) 2) ELSE Employment Nucleation = Present(0)	{1.} 1	{2.} 0	{1.} 1	{1.} 1	{1.} 1	{1.} 1	{1.} 1	{2.) 0

Table A5.8

Model 2: Security Assets
Condition 3: Security of Property and Person
Components a), b) & c)

Conceptualisation:	**Question Number**		**Question:**	**Answer Options & Logical Engineering:**		**Case ID:**							
						44	**28**	**33**	**60**	**22**	**12**	**50**	**8**
Security of Property and Person: **a) Security of Person** **b) Security of Property** **c) Security of Health**				<u>Security:</u> High(1) Low(0) <u>Coding rule:</u> 1) Security( ) = Security of Health( )		0	1	0	1	0	0	0	1

Table A5.9

Model 2: Security Assets
Condition 3: Security of Property and Person
Component a) Security of Person

Conceptualisation:	**Question Number**		**Question:**	**Answer Options & Logical Engineering:**		**Case ID:**							
	M2,					**44**	**28**	**33**	**60**	**22**	**12**	**50**	**8**
	3)												
Security of person		a)	In the period during your marriage before your last successful childbirth, in the neighbourhood you (mostly) lived in:	Security of Person: High(1) Low(0) Coding rule: 1) IF Perceived Exposure = Low(1) AND [Overall Confidence in Police = Medium(--) or High(1) OR Overall Confidence in Extended Family = Medium(--) or High(1)] THEN Security of Person = High(1) 2) ELSE IF Overall Confidence in Police = High(1) AND Overall Confidence in Extended Family = High(1) THEN Security of Person = High(1) 3) ELSE Security of Person = Low(0)		0	1	1	0	0	1	0	1

Perceived environmental exposure of the couple to security risks		i.	..if a couple walked every night from 10pm to 11pm how safe would it be for them? (Husband & Wife questionnaire)	<u>Perceived Exposure:</u> Low(1) Medium(--) High(0) <u>Answer options (one):</u> 1. Very safe 2. Safe 3. No difference (neutral) 4. Not safe 5. Not at all safe <u>Coding rule:</u> 1) USE the least safe ordinal Option noted for a Husband and Wife AS Couple's Joint Option {= }. 2) IF Couple's Joint Option {=1.} or {=2.} THEN Perceived Exposure = Low(1) 3) IF Couple's Joint Option {=3.} THEN Perceived Exposure = Medium(--) 4) IF Couple's Joint Option {=4.} or {=5.} THEN Perceived Exposure = High(0)	H W C	{3.} {2.} {=3.} --	{2.} {2.} {=2.} 1	{1.} {1.} {=1.} 1	{4.} {2.} {=4.} 0	{1.} {2.} {=2.} 1	{2.} {5.} {=5.} 0	{1.} {5.} {=5.} 0	{2.} {2.} {=2.} 1

Personalised security of couple		ii.	..how many times were you or your wife/husband victims of physical attack? (Husband & Wife questionnaire)	<u>Security of Couple:</u> High(1) Low(0) <u>Coding rule:</u> 1) IF Security of Husband = High(1) AND Security of Wife = High(1) THEN Security of Couple = High(1) 2) IF Security of Husband = Low(0) AND Security of Wife = Low(0) THEN Security of Couple = Low(0) 3) ELSE Security of Couple = Medium(--)		1	1	1	0	1	1	1	1
		/i.	Husband (attacks suffered)	<u>Security of Husband:</u> High(1) Low(0) <u>Answer options:</u> Number of physical attacks: <u>Coding rule:</u> 1) USE the highest Number of physical attacks suffered by the Husband stated by a Husband and Wife AS	H W C	{0} {0} {=0} 1	{0} {0} {=0} 1	{0} {0} {=0} 1	{2} {0} {=2} 0	{0} {0} {=0} 1	{0} {0} {=0} 1	{0} {0} {0} 1	{0} {0} {0} 1

				the Number of physical attacks suffered by the Husband {= }. 2) IF Number of physical attacks suffered by the Husband {=0} THEN Security of Husband = High(1) 3) ELSE Security of Husband = Low(0)									
		/ii.	Wife (attacks suffered)	<u>Security of Wife:</u> High(1) Low(0) <u>Answer options:</u> Number of physical attacks: <u>Coding rule:</u> 1) USE the highest Number of physical attacks suffered by the Wife stated by a Husband and Wife AS the Number of physical attacks suffered by the Wife {= }. 2) IF Number of physical attacks suffered by the Wife {=0} THEN Security of Wife = High(1) 3) ELSE Security of Wife = Low(0)	H W C	{0} {0} {=0} 1	{0} {0} {=0} 1	{0} {0} {=0} 1	{3} {0} {=3} 0	{0} {0} {=0} 1	{0} {0} {=0} 1	{0} {0} {=0} 1	{0} {0} {=0} 1

Personalised mitigation of exposure to violence		iii.	..how confident were you in the willingness and ability of the police to protect you and your wife/husband against physical attack? (Husband & Wife questionnaire)	<u>Overall Confidence in Police:</u> High(1) Low(0) <u>Coding rule:</u> 1) IF Confidence In Willingness Of Police = High(1) AND Confidence In Ability Of Police = High(1) THEN Overall Confidence in Police = High(1) 2) ELSE Overall Confidence in Police = Low(0)		1	1	1	1	0	1	1	0
		/i	Willingness of police to protect (Husband & Wife questionnaire)	<u>Confidence In Willingness Of Police:</u> High(1) Medium(--) Low(0) <u>Answer options (one):</u> 1. Not confident at all 2. Not confident 3. Neutral 4. Confident 5. Very confident	H W C	{4.} {UK} {=4.} 1	{5.} {UK} {=5.} 1	{4.} {5.} {=4.} 1	{4.} {4.} {=4.} 1	{4.} {2.} {=2.} 0	{4.} {4.} {=4.} 1	{5.} {UK} {=5.} 1	{2.} {UK} {=2.} 0

				<u>Coding rule:</u> 1) USE the least confident ordinal Option noted for a Husband and Wife AS Couple's Joint Option {= } UNLESS {UK} is noted for either 2) IF {UK} is noted for either THEN USE the Option noted for the other AS Couple's Joint Option {= }. 3) IF Couple's Joint Option {=1.} or {=2.} THEN Confidence In Willingness Of Police = Low(0) 4) IF Couple's Joint Option {=3.} THEN Confidence In Willingness Of Police = Medium(--) 5) IF Couple's Joint Option {=4.} or {=5.} THEN Confidence In Willingness Of Police = High(1)									

			Reasons (Husband & Wife questionnaire)	<u>Confidence In Willingness Of Police (reasons):</u> <u>Answer options:</u> Reasons: <u>Coding rule:</u> 1) NOT CODED: Reasons provided by the respondents are compared against the noted closed Options in the previous question 'Confidence in the willingness of police'. The reasons provided by all respondents are consistent with their closed responses.	H W	{I have seen the police helping other people..} {UK}	{..the police co-operate} {UK}	{If the police come I would be protected from attack} {..it is the duty of the police to protect us}	{(They are) people of law enforce-ment} {..they know we are good and innocent people}	{..have uniforms so willing to protect} {.. we do not have the ability to bribe police}	{..police is there for helping people} {I am inn-ocent so the police will help me}	{Govt people can protect us} {UK}	{The police take bribes} {UK}
		/ii	Ability of police to protect (Husband & Wife questionnaire)	<u>Confidence In Ability Of Police:</u> High(1) Medium(--) Low(0) <u>Answer options (one):</u> 1. Not confident at all 2. Not confident 3. Neutral 4. Confident 5. Very confident	H W C	{4.} {UK} {=4.} 1	{4.} {4.} {4.} 1	{5.} {5.} {5.} 1	{4.} {4.} {4.} 1	{5.} {4.} {4.} 1	{4.} {4.} {4.} 1	{5.} {UK} {5.} 1	{4.} {UK} {4.} 1

				<u>Coding rule:</u> 1) USE the least confident ordinal Option noted for a Husband and Wife AS Couple's Joint Option {= } UNLESS {UK} is noted for either. 2) IF {UK} is noted for either THEN USE the Option noted for the other AS Couple's Joint Option {= }. 3) IF Couple's Joint Option {=1.} or {=2.} THEN Confidence In Ability Of Police = Low(0) 4) IF Couple's Joint Option {=3.} THEN Confidence In Ability Of Police = Medium(--) 5) IF Couple's Joint Option {=4.} or {=5.} THEN Confidence In Ability Of Police = High(1)									

			Reasons (Husband & Wife questionnaire)	<u>Confidence In Ability Of Police (reasons):</u> <u>Answer options:</u> Reasons: <u>Coding rule:</u> 1) NOT CODED: Reasons provided by the respondents are compared against the noted closed Options in the previous question 'Confidence in the ability of police'. The reasons provided by all respondents are consistent with their closed responses.	H W	{The police have weap-ons..} {UK}	{..they are people of the system and law enforce-ment, so they have the ability} {..they are law enforce-ment people}	{..police have weapons..} {..it is the duty of police and their job so they have the ability..}	{(They are) people of law enforce-ment, Govt people, so they have the ability} {..police are power-ful, so they can protect us}	{..Govt employ-ees, have weapons and uniforms, so able to protect} {..police have the ability/ power to protect if they are willing}	{..Govt has given them power} {..police will fight against any wrong-doing}	{Every-one is afraid of the police bec-ause they are Govt People} {UK}	{The police have power} {UK}
Personalised mitigation of exposure to violence		iv.	..how confident were you in the willingness and ability of your own and your wife's extended family to protect you and your wife/husband against physical attack? (Husband & Wife questionnaire)	<u>Overall Confidence in Extended Family:</u> High(1) Medium(--) Low(0) <u>Coding rule:</u> 1) IF Confidence in Willingness of Extended Family = High(1) AND Confidence In Ability Of Extended Family = High(1) THEN Overall Confidence in Extended Family = High(1)		0	0	1	0	0	1	0	--

				2) IF Confidence in Willingness of Extended Family = Medium(--) OR Confidence In Ability Of Extended Family = Medium(--) THEN Overall Confidence in Extended Family = Medium(--) 3) ELSE Overall Confidence In Extended Family = Low(0)									
		/i.	Willingness of extended family to protect (Husband & Wife questionnaire)	<u>Confidence In Willingness Of Extended Family:</u> High(1) Medium(--) Low(0) <u>Answer options (one):</u> 1. Not confident at all 2. Not confident 3. Neutral 4. Confident 5. Very confident <u>Coding rule:</u> 1) USE the least confident ordinal Option noted for a Husband and Wife	H W C	{3.} {2.} {=2.} 0	{4.} {4.} {=4.} 1	{5.} {5.} {=5.} 1	{5.} {4.} {=4.} 1	{5.} {4.} {=4.} 1	{5.} {5.} {=5.} 1	{4.} {5.} {=4.} 1	{5.} {4.} {=4.} 1

				AS Couple's Joint Option {=} UNLESS {UK} is noted for either 2) IF {UK} is noted for either THEN USE the Option noted for the other AS Couple's Joint Option {=}. 3) IF Couple's Joint Option {=1.} or {=2.} THEN Confidence In Willingness Of Extended Family = Low(0) 4) IF Couple's Joint Option {=3.} THEN Confidence In Willingness Of Extended Family = Medium(--) 5) IF Couple's Joint Option {=4.} or {=5.} THEN Confidence In Willingness Of Extended Family = High(1)									

			Reasons (Husband & Wife questionnaire)	<u>Confidence In Willingness Of Extended Family (reasons):</u> <u>Answer options:</u> Reasons: <u>Coding rule:</u> 1) NOT CODED: Reasons provided by the respondents are compared against the noted closed Options in the previous question 'Confidence in willingness of extended family'. The reasons provided by all respondents are consistent with their closed responses.	H W	{..I do not have many relatives so I do not depend on others} {..extend-ed family is poor..}	{They are our own people, sincere people} {..we are members of the same family..}	{They are relatives so they will protect us} {..we are the same family}	{(They are) parents and relatives that is why} {..family unity..}	{.. the extended family will protect} {One brother would not ignore the other brother}	{..family do not want me to face risk or prob-lems} {I am a member of the family, so they will help me}	{..have money and can protect us} {..like me very much}	{Who else would come, if not relat-ives} {Bec-ause we are mem-bers of the same family}
			Note - Over that period did extended family sometimes look after the couple's children? (Husband & Wife questionnaire)	<u>Confidence In Willingness Of Extended Family (children):</u> High(1) Low(0) <u>Answer options (one):</u> a. Yes b. No <u>Coding rule:</u> 1) IF the Options noted for a Husband and Wife are the same USE	H W C	{b.} {a.} {=b.} 0	{a.} {a.} {=a.} 1	{a.} {a.} {=a.} 1	{a.} {a.} {=a.} 1	{a.} {a.} {=a.} 1	{a.} {a.} {=a.} 1	{a.} {a.} {=a.} 1	{a.} {a.} {=a.} 1

				the Options noted for a Husband and Wife AS Couple's Joint Option {= } 2) ELSE IF the Options noted for a Husband and Wife are {=a.} and {=b.} (in any order) USE Option {b.} AS Couple's Joint Option {= } 3) IF Couple's Joint Option {a.} THEN Confidence In Willingness Of Extended Family (children) = High(1) 4) IF Couple's Joint Option {b.} THEN Confidence In Willingness Of Extended Family (children) = Low(0)									
		/ii.	Ability of extended family to protect (Husband & Wife questionnaire)	<u>Confidence In Ability Of Extended Family:</u> High(1) Medium(--) Low(0) <u>Answer options (one):</u> 1. Not confident at all 2. Not confident	H W C	{3.} {2.} {=2.}	{4.} {2.} {=2.}	{5.} {5.} {=5.}	{4.} {2.} {=2.}	{4.} {2.} {=2.}	{4.} {4.} {=4.}	{4.} {2.} {=2.}	{5.} {3.} {=3.}

				3. Neutral 4. Confident 5. Very confident <u>Coding rule:</u> 1) USE the least confident ordinal Option noted for a Husband and Wife AS Couple's Joint Option {= } UNLESS {UK} is noted for either. 2) IF {UK} is noted for either THEN USE the Option noted for the other AS Couple's Joint Option {= }. 3) IF Couple's Joint Option {=1.} or {=2.} THEN Confidence In Ability Of Extended Family = Low(0) 4) IF Couple's Joint Option {=3.} THEN Confidence In Ability Of Extended Family = Medium(--) 5) IF Couple's Joint Option {=4.} or		0	0	1	0	0	1	0	--

				{=5.} THEN Confidence In Ability Of Extended Family = High(1)									
			Reasons (Husband & Wife questionnaire)	<u>Confidence In Ability Of Extended Family (reasons):</u> <u>Answer options:</u> Reasons: <u>Coding rule:</u> 1) NOT CODED: Reasons provided by the respondents are compared against the noted closed Options in the previous question 'Confidence in ability of extended family'. The reasons provided by all respondents are consistent with their closed responses	H W	{If i call them, they may or may not come} {..no ability or power}	{..they are our own people and sincere} {Lack of money}	{..they have strength and ability} {They would try their best}	{(They) have money and power so they could protect us} {They..are not financially sound}	{Because they have money..} {Financial crisis (very limited financial resour-ces)}	{..willing if they can afford it} {They have the willing-ness to help us}	{..they will help} {..not enough money}	{They have money, so they have ability} {Dep-ends on their willing-ness}
			Note – Over that period how many adult male relatives of the husband and wife lived within one hour travel of the couples' home: (Husband & Wife	<u>Confidence In Ability Of Extended Family (proximity):</u> High(1) Low(0) <u>Answer options:</u> Number of male relatives: <u>Coding rule:</u> 1) USE the least Number of male relatives noted for a Husband and Wife	H W C	{2} {4} {2} 1	{3-4} {2} {2} 1	{4} {6} {4} 1	{0} {1} {0} 0	{3} {6-7} {3} 1	{Skipped} {1} {1} 0	{4-5} {1} {1} 0	{0} {2} {0} 0

			questionnaire)	AS Couple's Joint Number {= } UNLESS {Skipped} is noted for either 2) IF {Skipped} is noted for either THEN USE the Number noted for the other AS Couple's Joint Number {= }. 3) IF Couple's Joint Number ≥ 2 THEN Confidence In Ability Of Extended Family (proximity) = High(1) 4) IF Couple's Joint Number < 2 THEN Confidence In Ability Of Extended Family (proximity) = Low(0)									

Table A5.10

Model 2: Security Assets
Condition 3: Security of Property and Person
Component b) Security of Property

Conceptualisation:	**Q. No.**		**Question:**	**Answer Options & Logical Engineering:**		**Case ID:**							
	M 2,					**44**	**28**	**33**	**60**	**22**	**12**	**50**	**8**
	3)												
Security of property		b)	In the period during your marriage before your last successful childbirth, in the neighbourhood you (mostly) lived in:	<u>Security of Property:</u> High(1) Medium(--) Low(0) 1) IF Perceived Security Of Property Rights = High(1) AND Perceived Violent Norms = Absent(1) THEN Security Of Property = High(1) 2) IF Perceived Security Of Property Rights = Low(0) AND Perceived Violent Norms = Present(0) THEN Security Of Property = Low(0) 3) ELSE Security Of Property = Medium(--)		--	--	--	0	--	0	1	--

Perceived general security of property rights		i.	..if someone locked up their house and went away for a while without leaving anyone to guard it, how many days would it be before the house was 'snatched' (illegally appropriated)? (Husband & Wife questionnaire)	<u>Perceived Security Of Property Rights:</u> High(1) Medium(--) Low(0) <u>Answer options (one):</u> 1. Number of days: 2. No likelihood <u>Coding rule:</u> 1) LIST BOTH Options noted for a Husband and Wife AS Couple's Joint Option {= } 2) IF Couple's Joint Option {=2. 2.} THEN Perceived Security Of Property Rights = High(1) 3) IF Couple's Joint Option {=1. 1.} THEN Perceived Security Of Property Rights = Low(0) 4) ELSE Perceived Security Of Property Rights = Medium(--)	H	{1., 30-90 days}	{2.}	{2.}	{1., 30 days}	{2.}	{1., 180 days}	{2.}	{2.}
					W	{UK}	{1., 30 Days}	{1., 120-150 days}	{1., 365-730 days}	{2.}	{1., 1825-3650 days}	{2.}	{2.}
					C	{=1. UK}	{=2. 1.}	{=2. 1.}	{=1. 1.}	{=2. 2.}	{=1. 1.}	{=2. 2.}	{=2. 2.}
						--	--	--	0	1	0	1	1

Personalised security of property rights		ii.	..did you ever have your house 'snatched' (illegally appropriated)? (Husband & Wife questionnaire)	<u>Personalised Security Of Property Rights:</u> High(1) Low(0) <u>Answer options (one):</u> 1. Yes 2. No IF YES The couple were: 1. Owners (real) 2. Tenants 3. Squatters <u>Coding rule:</u> 1) LIST BOTH Options noted for a Husband and Wife AS Couple's Joint Option {= } 2) IF Couple's Joint Option {=2. 2.} THEN Personalised Security Of Property Rights = High(1) 3) IF Couple's Joint Option {=1. 1.} THEN Personalised Security Of Property Rights = Low(0) 4) ELSE Personalised Security Of Property Rights = Medium(--)	H W C	{2.} {2.} {=2. 2.} 1	{2.} {2.} {=2. 2.} 1	{2.} {2.} {=2. 2.} 1	{2.} {2.} {=2. 2.} 1	{2.} {2.} {=2. 2.} 1	{2.} {2.} {=2. 2.} 1	{2.} {2.} {=2. 2.} 1	{2.} {2.} {=2. 2.} 1

Perceived violent norms relating to the assertion of property rights		iii.	..if someone stole an item of value and the owner knew where the thief was, what would be the most common method to get the item back? (Husband & Wife questionnaire)	<u>Perceived Violent Norms:</u> Absent(1) Present(0) <u>Answer options(one):</u> 1. Violence 2. Threat of violence 3. Political influence 4. Bribe police 5. Police intervention without bribe 6. Other (note): <u>Coding rule:</u> 1) LIST BOTH Options noted for a Husband and Wife AS the Couple's joint Option {= } 2) IF Couple's Joint Option CONTAINS {=6.} and violence or threat of violence is implied by the response, or {1.} or {2.} THEN Perceived Violent Norms = Present(0) 3) ELSE Perceived Violent Norms = Absent(1)	H	{6. I would try myself}	{6. Informal Trial}	{2.}	{1.}	{1.}	{2.}	{5.}	{6. Local comm -ittee (informal judiciary)}
					W	{6. First they would discuss it}	{6. Would speak to the elders/ parents of the thief}	{1.}	{6. Would invest-igate}	{UK}	{6. Through discussion}	{4.}	{2.}
					C	{=6. 6.}	{=6. 6.}	{=2. 1.}	{=1. 6.}	{=1. UK}	{=2. 6.}	{=5. 4.}	{=6. 2.}
						1	1	0	0	0	0	1	0

Source and means of personalised security of property rights		iv.	..if someone had stolen an item of value from you or your wife/husband, who would you have called for assistance and what would they have done to recover the item? (Husband & Wife questionnaire)	<u>Personalised Security Of Property Rights:</u> High(1) Low(0) <u>Answer options (both):</u> 1. Whose help would be taken: 2. How would the stolen goods be recovered: <u>Coding rule:</u> 1) CLASSIFY & LIST BOTH Option 2. responses noted for a Husband and Wife using: Implies Violence {=V} Implies Non-Violence {=N} AS Couple's Joint Option {= } 2) IF Couple's Joint Option CONTAINS {=V} THEN Personalised Security Of Property Rights = Low(0) 3) ELSE Personalised Security Of Property Rights = High(1)	H	{1. Relatives 2. Relatives would try to recover}	{1. Comm-ittee 2. Informal trial}	{1. Rela-tives 2. Beating the thief}	{1. Police 2. .. what-ever way they want}	{1. Senior people in society (informal judiciary) 2. (Informal) trial}	{1. Senior (respected) people in society 2. Through proof/ witness-es}	{1. Police 2. The police would invest-igate and recover}	{1. Rela-tives 2. Rela-tives would go to the comm-ittee}
					W	{1. No one – they would go directly to the thief 2. Through dis-cussion}	{1. Parents of the thief 2. Through dis-cussion}	{1. Locally resp-ected people 2. Informal trial}	{1. Neigh-bour 2. Dis-cussion}	{1. Neigh-bour 2. Discussion, .. and other methods}	{1. Senior (respected) people in society 2. Through discussion}	{1. Local comm-ittee 2. Informal trial}	{1. Resp-ectable people in society 2. Dis-cussion}
					C	{=N N}	{=N N}	{=V N}	{=N N}	{=N N}	{=N N}	{=N N}	{=N N}
						1	1	0	1	1	1	1	1

Perceived efficacy of personalised means to assert property rights		v.	.. how easy would it be for them to recover the stolen item for you? (Husband & Wife questionnaire)	<u>Percieved Efficacy:</u> High(1) Medium(--) Low(0) <u>Answer options (one):</u> 1. Almost impossible 2. Very difficult 3. Difficult 4. Neutral 5. Easy 6. Very easy 7. Extremely easy <u>Coding rule:</u> 1) USE the least easy ordinal Option noted for a Husband and Wife AS the Couple's Joint Option {= } 2) IF Couple's Joint Option {=1.} or {=2.} or {=3.} THEN Perceived Efficacy = Low(0) 3) IF Couple's Joint Option {=4.} THEN Perceived Efficacy = Medium(--) 4) IF Couple's Joint Option {=5.} or {=6.} or {=7.} THEN Perceived Efficacy = High(1)	H W C	{1.} {1.} {=1.} 0	{4.} {4.} {=4.} --	{6.} {2.} {=2.} 0	{1.} {3.} {=1.} 0	{3.} {2.} {=2.} 0	{4.} {1.} {=1.} 0	{6.} {2.} {=2.} 0	{5.} {1.} {=1.} 0

Personalised security of property rights		vi.	..did you or your wife/husband ever have something stolen from you? (Husband & Wife questionnaire)	<u>Personalised Security Of Property Rights:</u> High(1) Low(0) <u>Answer options (one):</u> 1. Yes 2. No IF YES Number of incidences: <u>Coding rule:</u> 1) LIST BOTH Options noted for a Husband and Wife AS the Couple's Joint Option {= } 2) IF Couple's Joint Option {=2. 2.} THEN Personalised Security Of Property Rights = High(1) 3) ELSE Personalised Security Of Property Rights = Low(0) <u>Data notes:</u> 1) The responses of Husband and Wife in couples 33 and 60 at first sight appear swapped with each other. Re-checking of the voice recording has verified responses are correctly noted.	H W C	{1., 4} {1., 3} {=1. 1.} 0	{2.} {2.} {=2. 2.} 1	{2.} {1., 2} {=2. 1.} 0	{1., 2} {2.} {=1. 2} 0	{2.} {2.} {=2. 2.} 1	{2.} {2.} {=2. 2.} 1	{2.} {2.} {=2. 2.} 1	{2.} {2.} {=2. 2.} 1

Table A5.11

Model 2: Security Assets
Condition 3: Security of Property and Person
Component c) Security of Health

Concept-ualisation:	**Q. No.**		**Question:**	**Answer Options & Logical Engineering:**		**Case ID:**							
	M 2,					**44**	**28**	**33**	**60**	**22**	**12**	**50**	**8**
	3)												
Security of Health		c)	In the period during your marriage before your last successful childbirth, in the neighbourhood you (mostly) lived in:	Security of Health: High(1) Low(0) Coding rule: 1) Security of Health ( ) = Quality of Maternal Healthcare Norms ( )		0	1	0	1	0	0	0	1
Environment-al exposure to maternal, stillbirth and neonatal related health risks		i.	..how many incidents of the following took place amongst neighbours (not relatives of the husband or wife)? (Husband & Wife questionnaire)										
		/i.	Women dying during childbirth	Exposure To Maternal Mortality: Low(1) Medium(--) High(0) Answer options: Number:	H W C	{UK} {1000} {=1000}	{UK} {5.5} {=5.5}	{UK} {2.5} {=2.5}	{UK} {11} {=11}	{UK} {5.5} {=5.5}	{0} {0} {=0}	{UK} {2} {=2}	{2} {0} {=2}

				<u>Coding rule:</u> 1) TREAT {UK} as n=0 and USE the highest Number noted for a Husband and Wife AS Couple's Joint Number {= } 2) IF Couple's Joint Number ≤ 3 THEN Exposure To Maternal Mortality = Low(1) 3) IF Couple's Joint Number ≥ 5 THEN Exposure To Maternal Mortality = High(0) 4) ELSE Exposure To Maternal Mortality = Medium(--) <u>Data notes:</u> 1) W44 stated 1000, noted as stated 2) W28 stated 5 to 6, noted as 5.5 3) W33 stated 2 to 3, noted as 2.5 4) W60 stated 10 to 12, noted as 11 5) W22 stated 5 to 6, noted as 5.5		0	0	1	0	0	1	1	1

		/ii.	Stillbirths	<u>Exposure To Stillbirth:</u> Low(1) Medium(--) High(0) <u>Answer options:</u> Number: <u>Coding rule:</u> 1) TREAT {UK} as n=0 and USE the highest Number noted for a Husband and Wife AS Couple's Joint Number {= } 2) IF Couple's Joint Number ≤ 3 THEN Exposure To Stillbirth = Low(1) 3) IF Couple's Joint Number ≥ 5 THEN Exposure To Stillbirth = High(0) 4) ELSE Exposure To Stillbirth = Medium(--) <u>Data notes:</u> 1) W44 stated 7 to 8, noted as 7.5 2) W60 stated 10 to 12, noted as 11	H W C	{UK} {7.5} {=7.5} 0	{UK} {0} {=0} 1	{UK} {2} {=2} 1	{2} {11} {=11} 0	{5.5} {11} {=11} 0	{3} {0} {=3} 1	{UK} {1} {=1} 1	{UK} {0} {=0} 1

				3) H22 stated 5 to 6, noted as 5.5 4) W22 stated 10 to 12, noted as 11 5) H12 stated 2 to 4, noted as 3									
		/iii.	New born deaths	<u>Exposure To Neonatal Mortality:</u> Low(1) Medium(--) High(0) <u>Answer options:</u> Number: <u>Coding rule:</u> 1) TREAT {UK} as n=0 and USE the highest Number noted for a Husband and Wife AS Couple's Joint Number {= } 2) IF Couple's Joint Number ≤ 3 THEN Exposure To Neonatal Mortality = Low(1) 3) IF Couple's Joint Number ≥ 5 THEN Exposure To Neonatal Mortality = High(0) 4) ELSE Exposure To Neonatal Mortality = Medium(--)	H W C	{1} {7.5} {=7.5} 0	{UK} {2} {=2} 1	{UK} {0} {=0} 1	{2} {11} {=11} 0	{2} {11} {=11} 0	{3} {1.5} {=3} 1	{UK} {1} {=1} 1	{2.5} {0} {=2.5} 1

				Data notes: 1) W44 stated 7 to 8, noted as 7.5 2) W60 stated 10 to 12, noted as 11 3) W22 stated 10 to 12, noted as 11 4) H12 stated 2 to 4, noted as 3 5) W12 stated 1 to 2, noted as 1.5 6) H8 stated 2 to 3, noted as 2.5								
Norms of access to higher quality healthcare – maternal health		ii.	..what type of childbirth assistance was most commonly used in that neighbourhood? (Husband & Wife questionnaire) SD Linkage: MICS3 2006, BDHS 2007	Quality Of Maternal Healthcare Norms: High(1) Low(0) Answer options: People usually present in the delivery room (one+): 1. Doctor 2. Nurse/Midwife 3. Family welfare visitor 4. Community skilled birth attendant 5. TBA 6. Relatives 7. Friends 8. Neighbours 9. Other (note):	H W C	{5.} {5., 6., 8.} {=5.} 0	{2.} {5., 8.} {=2.} 1	{5.} {3., 6., 8.} {=3.} 0	{5.} {2., 6., 8.} {=2.} 1	{5.} {5., 6., 8.} {=5.} 0	{5., 8.} {5., 6.} {=5.} 0	{5.} {5.} {=5.} 0	{5.} {2., 6.} {=2.} 1

				<u>Coding rule:</u> 1) TREAT Options {1.} to {6.} AS ordinal with Options {7.} and {8.} as equivalent to Option {6.} 2) USE the most qualified ordinal Option noted for a Husband and Wife AS Couple's Joint Option {= } 3) IF Couple's Joint Option {=1.} or {=2.} THEN Quality Of Maternal Healthcare Norms = High(1) 4) ELSE Quality Of Maternal Healthcare Norms = Low(0)									

Environment-al exposure to child mortality related risks		iii.	..how many child deaths took place in that neighbourhood, and what were the causes for each? (Husband & Wife questionnaire)	<u>Exposure To Child Mortality:</u> Low(1) High(0) <u>Answer options (both):</u> Number of child (under age 5) deaths: Causes: <u>Coding rule:</u> 1) TREAT {UK} as 0 2) USE the highest Number noted for a Husband and Wife AS Couple's Joint Number {= } 3) IF Couple's Joint Number ≤ 4 THEN Exposure To Child Mortality = Low(1) 4) ELSE Exposure To Child Mortality = High(0) <u>Data notes:</u> 1) W44 stated 2 to 3, noted as 2.5 2) W12 stated 1 to 2, noted as 1.5	H W C	{UK} {2.5} {=2.5} 1	{UK} {0} {=0} 1	{UK} {0} {=0} 1	{UK} {10, Accidents, lack of medical treatment, diseases} {=10} 0	{UK} {0} {=0} 1	{UK} {1.5, disease and drowning} {=1.5} 1	{2, Sick after being born, treatment could not be afforded} {0} {=2} 1	{UK} {0} {=0} 1

Environment-al exposure to child permanent injury risks		iv.	..how many children had permanent injuries in that neighbourhood, and what type of injury did they have? (Husband & Wife questionnaire)	<u>Exposure To Child Injury:</u> Low(1) High(0) <u>Answer options (both):</u> Number of child injuries (any age): Type of injuries: <u>Coding rule:</u> 1) TREAT {UK} as n=0 2) USE the highest Number noted for a Husband and Wife AS Couple's Joint Number {= } 3) IF Couple's Joint Number ≤ 4 THEN Exposure To Child Injury = Low(1) 4) ELSE Exposure To Child Injury = High(0) <u>Data notes:</u> 1) W60 stated 20 to 30, noted as 25	H	{2, Injuries caused by the respond-ent's rickshaw chain}	{UK}	{UK}	{1, Slipped on floor}	{UK}	{0}	{UK}	{None/ UK}
					W	{2, Leg amputation, became deaf/dumb (non-congential)}	{0}	{1, A child's leg was amput-ated due to an accident}	{20-30, Paralysis, burns, loss of limbs}	{0}	{0}	{0}	{0}
					C	{=2}	{=0}	{=1}	{25}	{=0}	{=0}	{=0}	{=0}
						1	1	1	0	1	1	1	1

Norms of access to higher quality healthcare – medicinal remedies used for children		v.	..what type of medication was most commonly used in that neighbourhood when children fell seriously ill? (Husband & Wife questionnaire)	<u>Modern Medicine Usage:</u> High(1) Low(0) <u>Answer options (one):</u> 1. Traditional 2. Religious 3. Pharmaceutical Note usual source of remedies e.g. doctor, pharmacy etc: <u>Coding rule:</u> 1) LIST BOTH Options noted for a Husband and Wife AS Couple's Joint Option {= } 2) IF Couple's Joint Option {=3. 3.} THEN Modern Medicine Usage = High(1) 3) ELSE Modern Medicine Usage = Low(0)	H W C	{3., Doctor} {3., Doctor} {=3. 3.} 1	{3., Doctor} {3., Pharmacy} {=3. 3.} 1	{3., Pharmacy} {3., Doctor} {=3. 3.} 1	{3., Doctor} {3., Pharmacy} {=3. 3.} 1	{3., Doctor} {3., Pharmacy} {=3. 3.} 1	{3., doctor} {3., Doctor} {=3. 3.} 1	{1., Traditional healer} {3., Doctor} {=1. 3.} 0	{3., Doctor/ Hospital} {3., Doctor} {=3. 3.} 1

Table A5.12	Model 2: Security Assets Condition 4/Outcome 1C: Couple's Fertility Demand											
Conceptualisation:	**Question Number**		**Question:**	**Answer Options & Logical Engineering:**	**Case ID:**							
					44	**28**	**33**	**60**	**22**	**12**	**50**	**8**
Couple's Fertility Demand				Couple's Fertility Demand: Low(1) Medium(--) High(0) Coding rule: 1) IF Husband's Fertility Demand = Low(1) AND Wife's Fertility Demand = Low(1) THEN Couple's Fertility Demand = Low(1) 2) IF Husband's Fertility Demand = High(0) AND Wife's Fertility Demand = High(0) THEN Couple's Fertility Demand = High(0) 3) ELSE Couple's Fertility Demand = Medium(--)	0	1	--	1	--	1	--	1

				<u>Husband's Fertility Demand:</u> Low(1) Medium(--) High(0) <u>Using Coding Result from:</u> Model 1: Wealth Flows Condition 4/Outcome 1H: Husband's Fertility Demand	0	1	0	1	1	1	0	1
				<u>Wife's Fertility Demand:</u> Low(1) Medium(--) High(0) <u>Using Coding Result from:</u> Model 3: Bargaining and Social Norms Condition 6/Outcome 1W: Wife's Fertility Demand	0	1	1	1	--	1	1	1

Table A5.13

Model 3: Bargaining and Social Norms
Condition 1: Socio-economic Positioning

Condition:	**Conceptualisation:**	**Question Number**		**Question:**	**Answer Options & Logical Engineering:**	**Case ID:**							
		M2,				**44**	**28**	**33**	**60**	**22**	**12**	**50**	**8**
Socio-economic Positioning					Socio-economic Positioning: High(1) Medium(--) Low(0) Using Data from: Model 2: Security Assets Condition 1: Socio-economic Positioning	--	1	0	--	--	0	1	--

Table A5.14

Model 3: Bargaining and Social Norms
Condition 2: Divorce Threat

Condition:	**Conceptualisation:**	**Question Number**		**Question:**	**Answer Options & Logical Engineering:**	**Case ID:**							
		Dm,				**44**	**28**	**33**	**60**	**22**	**12**	**50**	**8**
Divorce Threat					Divorce Threat: Absent(1) Present(0) Coding rule: Divorce Threat ( ) = Socio-religious Possibility of Divorce ( )	0	0	0	0	1	1	1	1
				Please tell us the following about the head of the household:									
	Socio-religious possibility of divorce	2)		..Religion of household head: (Husband questionnaire) SD Linkage: BDHS 2007, MICS3 2006	Socio-religious Possibility of Divorce: Absent(1) Present(0) Answer options {one}: 1. Muslim 2. Hindu 3. Christian 4. Buddhist 5. Other (note): 6. No religion Coding rule: 1) IF Option {2.} THEN Socio-religious Possibility of Divorce = Absent(1)	{1.} 0	{1.} 0	{1.} 0	{1.} 0	{2.} 1	{2.} 1	{2.} 1	{2.} 1

					2) IF Option {1.} THEN Socio-religious Possibility of Divorce = Present(0)								

Table A5.15

Model 3: Bargaining and Social Norms
Condition 3: Patriarchal Risk

Condition:	**Conceptual-isation:**	**Q. No.**		**Question:**	**Answer Options & Logical Engineering:**		**Case ID:**							
		M 3,					**44**	**28**	**33**	**60**	**22**	**12**	**50**	**8**
Patriarchal risk at start of marriage		3)			<u>Patriarchal Risk at Start:</u> Low(1) Medium(--) High(0) <u>Coding rule:</u> 1) IF Wife's Educational Attainment at Start = Present(1) AND Ever Employment of Wife before Start = Present(1) THEN Patriarchal Risk at Start = Low(1) 2) IF Wife's Educational Attainment at Start = Absent(0) AND Ever Employment of Wife before Start = Absent(0) THEN Patriarchal Risk at Start = High(0) 3) ELSE Patriarchal Risk at Start = Medium(--)		--	1	--	1	0	--	0	0

	Patriarchal economic risk faced by the wife at the start of marriage		d)	At the time you got married:										
	Educational attainment of the husband at start of marriage		i.	..Up to what qualification level had you completed? (Husband questionnaire) <u>SD Linkage:</u> BDHS 2007, MICS3 2006	<u>Husband's Educational Attainment at Start:</u> Present(1) Absent(0) <u>Answer options {one}:</u> 1. None 2. Literacy 3. Primary 4. Secondary 5. College 6. BA/Bcom/Bsc 7. MA/MCom/MSc 8. PhD 9. Other (note): Note- if answer is 1-5, record the highest grade/class attended {G0 to G12}: <u>Coding rule:</u> 1) IF Option {2.} to {9.} THEN Husband's Educational Attainment at Start = Present(1) 2) ELSE Husband's Educational Attainment at Start = Absent(0)		{1.} 0	{2., G2} 1	{1.} 0	{3., G8} 1	{2., G2} 1	{1.} 0	{2., G3} 1	{1., G1} 0

	Type of educational institution attended by the husband for that qualification		ii.	..What type of institution did you attend for that qualification? (Husband questionnaire) SD Linkage: BDHS 2007, MICS3 2006	Husband's Educational Institution Quality at Start: High(1) Low(0) Answer options {one}: 1. Madrassah 2. Bengali medium institution 3. English medium institution 4. Abroad (where): 5. Other (note): Additional option noted: Non-applicable {NA} noted when the respondent did not attend an institution Coding rule: 1) NOT CODED: All noted data for this indicator across the cases is either {NA} (no institution attended) or Option {2.}. Since for those cases in which an institution was attended there is no variation in the type of institution attended across cases, coding cannot proceed in a meaningful manner.		{NA}	{2.}	{NA}	{2.}	{2.}	{NA}	{2.}	{2.}
	Educational attainment of the wife at start of marriage		iii.	..Up to what qualification level had you completed? (Wife questionnaire) SD Linkage: BDHS 2007, MICS3 2006	Wife's Educational Attainment at Start: Present(1) Absent(0) Answer options {one}: 1. None 2. Literacy 3. Primary		{1.} 0	{2., G3} 1	{3., G skipped} 1	{3., G6} 1	{1.} 0	{3., G6} 1	{1.} 0	{1.} 0

					4. Secondary 5. College 6. BA/Bcom/Bsc 7. MA/MCom/MSc 8. PhD 9. Other (note): Note- if answer is 1-5, record the highest grade/class attended {G0 to G12}: <u>Coding rule:</u> 1) IF Option {2.} to {9.} THEN Wife's Educational Attainment at Start = Present(1) 2) ELSE Wife's Educational Attainment at Start = Absent(1)									
	Type of educational institution attended by the wife for that qualification		iv.	..What type of institution did you attend for that qualification? (Wife questionnaire) <u>SD Linkage:</u> BDHS 2007, MICS3 2006	<u>Wife's Educational Institution Quality at Start:</u> High(1) Low(0) <u>Answer options (one):</u> 1. Madrassah 2. Bengali medium institution 3. English medium institution 4. Abroad (where): 5. Other (note): <u>Additional option noted:</u> Non-applicable {NA} noted when the respondent did not attend an institution		{NA}	{2.}	{2.}	{2.}	{NA}	{2.}	{NA}	{NA}

					Coding rule: 1) NOT CODED: See d)ii comments above which also apply here									
	Ever employment of wife before marriage		v.	Did you ever work before your marriage? (Wife questionnaire)	Ever Employment of Wife before Start: Present(1) Absent(0) Answer options (one): 1. Yes 2. No Coding rule: 1) IF Option {1.} THEN Ever Employment of Wife before Start = Present(1) 2) ELSE Ever Employment of Wife before Start = Absent(0)		{1.} 1	{1.} 1	{2.} 0	{1.} 1	{2.} 0	{2.} 0	{2.} 0	{2.} 0
	IF YES: Total duration of employment and type of work		vi.	IF YES: i. How many months in total did you work? ii. What type of work did you mostly do? (Wife questionnaire)	Wife's Total Duration and Type of Employment (before Start): Answer options (both): i. Total months worked: ii. Main type of work: Additional option noted: Non-applicable {NA} noted when the respondent did not work before marriage		{24/ 36= 30, Maid}	{6, Garm-ent Work}	{NA}	{72/ 84= 78, Garm-ent Work}	{NA}	{NA}	{NA}	{NA}

					Coding rule: 1) NOT CODED: The data does not present an opportunity for meaningful coding due to the large proportion of {NA} data.									
	Patriarchal security risk faced by the wife at the start of marriage		e)	When you first got married, for people living in the same neighbourhood as you..	Patriarchal Security Risk at Start: Absent(1) Present(0) Coding rule: 1) IF Perceived Exposure of Women to Security Risks at Start = Perceived Exposure of Men to Security Risks at Start THEN Patriarchal Security Risk at Start = Absent(1) 2) IF Perceived Exposure of Women to Security Risks at Start = High(0) AND Perceived Exposure of Men to Security Risks at Start = Low(1) THEN Patriarchal Security Risk at Start = Present(0)		0	0	0	0	1	0	0	1

	Perceived exposure of women to security risks		i.	..If a woman walked unaccompanied everynight from 10pm to 11pm how safe would it be for her? (Husband & Wife questionnaire)	<u>Perceived Exposure of Women to Security Risks at Start:</u> Low(1) Medium(--) High(0) <u>Answer options {one}:</u> 1. Very safe 2. Safe 3. No difference (neutral) 4. Not safe 5. Not safe at all <u>Coding rule:</u> 1) USE the least safe ordinal Option noted for a Husband and Wife AS the Couple's Joint Option {= }. 2) IF Couple's Joint Option is {=1.} or {=2.} THEN Perceived Exposure of Women to Security Risks at Start = Low(1) 3) IF Couple's Joint Option is {=3.} THEN Perceived Exposure of Women to Security Risks at Start = Medium(--) 4) IF Couple's Joint Option is {=4.} or {=5.} THEN Perceived Exposure of Women to Security Risks at Start = High(0)	H W C	{5.} {4.} {=5.} 0	{4.} {4.} {=4.} 0	{5.} {1.} {=5.} 0	{4.} {4.} {=4.} 0	{2.} {4.} {=4.} 0	{3.} {5.} {=5.} 0	{5.} {4.} {=5.} 0	{5.} {UK} {=5.} 0

	Perceived exposure of men to security risks		ii.	..If a man walked unaccompanied everynight from 10pm to 11pm how safe would it be for him? (Husband & Wife questionnaire)	<u>Perceived Exposure of Men to Security Risks at Start:</u> Low(1) Medium(--) High(0) <u>Answer options {one}:</u> 1. Very safe 2. Safe 3. No difference (neutral) 4. Not safe 5. Not safe at all <u>Coding rule:</u> 1) USE the least safe ordinal Option noted for a Husband and Wife AS the Couple's Joint Option {= }. 2) IF Couple's Joint Option is {=1.} or {=2.} THEN Perceived Exposure of Men to Security Risks at Start = Low(1) 3) IF Couple's Joint Option is {=3.} THEN Perceived Exposure of Men to Security Risks at Start = Medium(--) 4) IF Couple's Joint Option is {=4.} or {=5.} THEN Perceived Exposure of Men to Security Risks at Start = High(0)	H W C	{1.} {4.} {=4.} 0	{1.} {4.} {=4.} 0	{5.} {1.} {=5.} 0	{4.} {5.} {=5.} 0	{2.} {2.} {=2.} 1	{2.} {5.} {=5.} 0	{2.} {4.} {=4.} 0	{2.} {2.} {=2.} 1

Table A5.16

Model 3: Bargaining and Social Norms
Condition 4: Wife's Bargaining Power at Start of Marriage

Condition:	**Conceptualisation:**	**Question Number**		**Question:**	**Answer Options & Logical Engineering:**	**Case ID:**							
		M3,				**44**	**28**	**33**	**60**	**22**	**12**	**50**	**8**
Wife's relative bargaining power at start of marriage		4)			Wife's Bargaining Power at Start: High(1) Medium(--) Low(0) Coding rule: 1) Wife's Bargaining Power at Start( ) = Wife's Age Disadvantage at Start ( )	0	0	0	1	0	1	0	1
	Wife's agency in choice of maternal healthcare		a)										
	Agency of wife in choice of delivery setting for first childbirth		i.	During your first pregnancy, who decided about the place where you should have your delivery?	Wife's Agency in Delivery Setting for First Childbirth: Present(1) Absent(0) Answer options {one+}: 1. Father in-law 2. Mother in-law 3. Father 4. Mother 5. Husband 6. Respondent 7. Other (note):	{6., 1} 1	{4.5.6., 1} 1	{2.3.4. 5.6.7. Neigh -bour, 1} 1	{3.4.5. 6.7, Neigh - bour, 2} 1	{5., 1} 0	{1.2.5. 6., 1} 1	{3.4., 1} 0	{5.6., 1.} 1

				SD Linkage: Place of Del. BDHS 2007, MICS3 2006	Place of delivery {one}: 1. Home 2. Public sector clinic 3. NGO sector clinic 4. Private sector clinic Coding rule: 1) IGNORE Place of Delivery 2) IF Option includes {6.} THEN Wife's Agency in Delivery Setting for First Childbirth = Present(1) 3) ELSE Wife's Agency in Delivery Setting for First Childbirth = Absent(0) Data notes: 1) W60: complications resulted in an induced stillbirth at the clinic.								
	Agency of wife in choice of main healthcare provider for first childbirth		ii.	During your first pregnancy, who decided about who should deliver the baby?	Wife's Agency in Healthcare Provision at First Childbirth: Present(1) Absent(0) Answer options {one+}: 1. Father in-law 2. Mother in-law 3. Father 4. Mother 5. Husband 6. Respondent 7. Other (note):	{7. Rela-tives, PDR: 5.6.} 0	{6., PDR: 5.6.8.} 1	{5.6., PDR: 5.6.8} 1	{3.4.5. 6.7. Neigh -bour, PDR: 1.2.4. 6.} 1	{2.5., PDR: 5.6.8 } 0	{1.2., PDR: 5.6.} 0	{4., PDR: 5.6.} 0	{5.6., PDR: 1.4.} 1

				<u>SD Linkage:</u> Present in rm. BDHS 2007, MICS3 2006	During the first delivery, who were present in the delivery room {one+}: 1. Doctor 2. Nurse/Midwife 3. Family welfare visitor 4. Community skilled birth attendant 5. TBA 6. Relatives 7. Friends 8. Neighbours 9. Other (note): <u>Coding rule:</u> 1) IGNORE who were present in delivery room {PDR:} 2) IF Option includes {6.} THEN Wife's Agency in Healthcare Provision at First Childbirth = Present(1) 3) ELSE Wife's Agency in Healthcare Provision at First Childbirth = Absent(0) <u>Data notes:</u> 1) W60 –complications resulted in an induced stillbirth								

	Possible weighting factor		iii.	Before your first childbirth, how many incidents amongst your own relatives and your husband's relatives did you know about of:									
			/i.	Women dying due to childbirth SD Linkage: Place of del. BDHS 2007, MICS3 2006	Answer options {all three}: 1. Number of women deaths: 2. Relationship of each woman to wife or husband: 3. Place of delivery (with each relationship) a. Home b. Public sector c. NGO sector d. Private Coding rule: NOT CODED – insufficient variation to allow meaningful coding	{n=1, Wife's mother, a.}	{n=0}	{n=0}	{n=0}	{n=0}	{n=0}	{n=0}	{n=0}
			/ii.	Stillbirths SD Linkage: Place of del. BDHS 2007, MICS3 2006	Answer options {all three}: 1. Number of stillbirths: 2. Relationship of each child's mother to wife or husband: 3. Place of delivery (with each relationship) a. Home b. Public sector	{n=0}	{n=1, Wife's cousin, a.}	{n=0}	{n=0}	{n=0}	{n=1, Hus-band's sister, a.}	{n=0}	{n=0}

					c. NGO sector d. Private <u>Coding rule:</u> NOT CODED - insufficient variation to allow meaningful coding								
			/iii.	New born deaths <u>SD Linkage:</u> Place of del. BDHS 2007, MICS3 2006	<u>Answer options {all three}:</u> 1. Number of new born deaths: 2. Relationship of each child's mother to wife or husband: 3. Place of delivery (with each relationship) a. Home b. Public sector c. NGO sector d. Private <u>Coding rule:</u> NOT CODED - insufficient variation to allow meaningful coding <u>Data notes:</u> 1) W44: the new borns were twins	{n=2, Husband's mother, a.}	{n=0}	{n=0}	{n=0}	{n=0}	{n=0}	{n=0}	{n=0}
	Wife's agency in choice of employment status at start of marriage		b)	During your marriage before your first childbirth:	<u>Wife's Agency in Choice of Employment Status at Start:</u> NOT CODED: The only indicator for this concept, Ability to Change Employment Status at Start, exhibits no variation and therefore does not allow meaningful coding of Wife's Agency in Choice of Employment Status at Start.								

	Employment status This question is asked only for contextualisation of the next question which relates to agency in choice		i.	..Did you ever work?	<u>Ever Employment of Wife Between Start-First Childbirth:</u> Present (1) Absent (0) <u>Answer options {one}:</u> 1. Yes 2. No <u>Coding rule:</u> 1) IF Option {1.} THEN Ever Employment of Wife Between Start-First Childbirth = Present(1) 2) ELSE Ever Employment of Wife Between Start-First Childbirth = Absent(0)	{1.} 1	{1.} 1	{1.} 1	{1.} 1	{2.} 0	{2.} 0	{2.} 0	{2.} 0
	Perceived ability to change employment status without hindrance		ii.	..If you had wanted to start/stop working, would you have faced a conflict with your husband or in-laws?	<u>Ability to Change Employment Status at Start:</u> Present(1) Absent(0) <u>Answer options {one}:</u> 1. Yes 2. No <u>Coding rule:</u> 1) IF Option {2.} THEN Ability to Change Employment Status at Start = Present(1)	{2.} 1	{2.} 1	{2.} 1	{2.} 1	{2.} 1	{2.} 1	{2.} 1	{2.} 1

					2) ELSE Ability to Change Employment Status at Start = Absent(0) <u>NOTE:</u> Lack of variation in values renders this indicator unusable for coding the concept. <u>Data notes:</u> 1) W44: Although answering option {2.} 'No', this respondent also mentioned she had never done anything of her own free will, which calls into question the ability of this question to capture ability to change employment status. 2) W28: Although answering option {2.} 'No', the respondent mentioned the possibility of conflict if she were to work outside of the home. This question however only aims to capture ability to stop or start working.								
			/i.	IF YES: Who would have objected?	<u>Answer options {one+}:</u> 1. Husband 2. Father in law 3. Mother in law 4. Other (note):								

			/ii	Why would they object?	<u>Answer options:</u> Reasons:								
	Wife's freedom of mobility at start of marriage		c)	During your marriage before your first childbirth:	<u>Wife's Freedom of Mobility at Start:</u> NOT CODED: Both the indicators of this concept, Explicit Restriction on Mobility and Implicit Restriction on Mobility, exhibit no variation and therefore do not allow meaningful coding of Wife's Freedom of Mobility at Start								
	Explicit restriction on desired mobility		i.	..How many times did you feel like going somewhere but were actually stopped by your husband or in-laws?	<u>Explicit Restriction on Mobility:</u> Absent(1) Present(0) <u>Answer options {one}:</u> 1. Number of times restricted: 2. Never restricted <u>Coding rule:</u> 1) IF Option {2.} THEN Explicit Restriction on Mobility = Absent(1) 2) ELSE Explicit Restriction on Mobility = Present(0) <u>NOTE:</u> Lack of variation in values renders this indicator unusable for coding the concept.	{2.} 1	{2.} 1	{2.} 1	{2.} 1	{2.} 1	{2.} 1	{2.} 1	{2.} 1

			/i.	IF RESTRICTED: Desired destinations?	<u>Answer options:</u> Destinations:								
			/ii.	Stopped by whom?	<u>Answer options {one+}:</u> 1. Husband 2. Father in law 3. Mother in law 4. Other (note):								
			/iii.	Reasons?	<u>Answer options:</u> Reasons:								
	Implicit restriction on desired mobility		ii.	.. How many times did you feel like going somewhere but did not ask your husband or in-laws because you knew they would stop you anyway?	<u>Implicit Restriction on Mobility:</u> Absent(1) Present(0) <u>Answer options {one}:</u> 1. Number of times did not ask: 2. Never felt this restriction <u>Coding rule:</u> 1) IF Option {2.} THEN Implicit Restriction on Mobility = Absent(1) 2) ELSE Implicit Restriction on Mobility = Present(0) <u>NOTE:</u> Lack of variation in values renders this indicator unusable for coding the concept.	{2.} 1	{2.} 1	{2.} 1	{2.} 1	{2.} 1	{2.} 1	{2.} 1	{2.} 1

			/i.	IF DID NOT ASK: Desired destinations?	<u>Answer options:</u> Destinations:								
			/ii.	Who would have objected?	<u>Answer options {one+}:</u> 1. Husband 2. Father in law 3. Mother in law 4. Other (note):								
			/iii.	Reasons?	<u>Answer options:</u> Reasons:								
	Wife's relative age disadvantage		d)		<u>Wife's Age Disadvantage at Start:</u> Low(1) Medium(--) High(0) <u>Coding rule:</u> 1) CALCULATE Husband's Age at Start minus Wife's Age at Start = Wife's Age Disadvantage at Start {=} 2) IF {=} <=5 THEN Wife's Age Disadvantage at Start = Low(1) 3) IF {=} >=10 THEN Wife's Age Disadvantage at Start = High(0)	{26 -12 =14} 0	{29 -17 =12} 0	{30 -20 =10} 0	{20 -20 =0} 1	{26 -16 =10} 0	{22 -17 =5} 1	{28 -13 =15} 0	{20 -18 =2} 1

					4) ELSE Wife's Age Disadvantage at Start = Medium(--) <u>Data Notes:</u> 1) If age was specified using two figures, e.g. 19/20, use the highest.								
	Husband's age at start of cohabitation		i.	How old was your husband when you started living with him? <u>SD Linkage:</u> BDHS 2007, MICS3 2006	<u>Husband Age at Start:</u> <u>Answer options:</u> Husband's age:	{25/26}	{29}	{30}	{19/20}	{25/26}	{22}	{28}	{20}
	Wife's age at start of cohabitation		ii.	How old were you when you started living with your husband? <u>SD Linkage:</u> BDHS 2007, MICS3 2006	<u>Wife Age at Start:</u> <u>Answer options:</u> Wife's age:	{12}	{17}	{20}	{20}	{15/16}	{17}	{13}	{17/18}

Table A5.17

Model 3: Bargaining and Social Norms
Condition 5: High-Fertility Related Positive Social Sanctions at Start of Marriage

Condition:	**Conceptualisation:**	**Question Number**		**Question:**	**Answer Options & Logical Engineering:**		**Case ID:**							
		M3,					**44**	**28**	**33**	**60**	**22**	**12**	**50**	**8**
High fertility related positive social snactions at start		5)			<u>High Fertility Positive Social Sanctions at Start:</u> Low(1) Medium(--) High(0) <u>Coding rule:</u> 1) IF FROM S/D Preference Norms1, S/D Preference Norms2, Quantity Preference Norms1, Quantity Preference Norms2, Quantity Preference Norms3, Quantity Preference Norms4, ANY 3 (or more) = 1 THEN High Fertility Positive Social Sanctions at Start = Low(1) 2) IF FROM S/D Preference Norms1, S/D Preference Norms2, Quantity Preference Norms1, Quantity Preference Norms2, Quantity Preference Norms3, Quantity Preference Norms4, ANY 3 (or more) = 0 THEN High Fertility Positive Social Sanctions		0	--	--	1	--	1	--	--

					at Start = High(0) 3) ELSE High Fertility Positive Social Sanctions at Start = Medium(--)									
	Social respect for a couple by varying quantity and sex composition of children		a)	When you first got married, for a couple living in the same neighbourhood as you, would they have more social respect if they had:										
			i.	..Many sons or many daughters? (Husband & Wife questionnaire)	<u>S/D Preference Norms1:</u> Absent(1) Present(0) <u>Answer options (one):</u> 1. Many sons 2. Many daughters 3. No difference 4. Don't know <u>Coding rule:</u> 1) USE Only the same option {} noted for a Husband and Wife AS Couple's Joint Option {=} 2) IF Couple's Joint Option = {3.} OR {4.} THEN S/D Preference Norms1= Absent(1)	H W C	{1.} {1.} {=1.} 0	{1.} {4.} --	{1.} {3.} --	{4.} {2.} --	{1.} {4.} --	{3.} {3.} {=3.} 1	{1.} {4.} --	{1.} {1.} {=1.} 0

					3) IF Couple's Joint Option = {1.} OR {2.} THEN S/D Preference Norms1 = Present(0)									
			ii.	.. Few sons or few daughters? (Husband & Wife questionnaire)	<u>S/D Preference Norms2:</u> Absent(1) Present(0) <u>Answer options (one):</u> 1. Few sons 2. Few daughters 3. No difference 4. Don't know <u>Coding rule:</u> 1) USE Only the same option {} noted for a Husband and Wife AS Couple's Joint Option {=} 2) IF Couple's Joint Option = {3. } OR {4.} THEN S/D Preference Norms2= Absent(1) 3) IF Couple's Joint Option = {1.} OR {2.} THEN S/D Preference Norms2 = Present(0)	H W C	{1.} {1.} {=1.} 0	{1.} {4.} --	{1.} {3.} --	{4.} {1.} --	{2.} {4.} --	{1.} {2.} --	{1.} {4.} --	{1.} {4.} --

			iii.	..Many sons or few sons? (Husband & Wife questionnaire)	<u>Quantity Preference Norms1:</u> Low(1) Medium(--) High(0) <u>Answer options (one):</u> 1. Many sons 2. Few sons 3. No difference 4. Don't know <u>Coding rule:</u> 1) USE Only the same option {} noted for a Husband and Wife AS Couple's Joint Option {=} 2) IF Couple' Joint Option = {2.} THEN Quantity Preference Norms1 = Low(1) 3) IF Couple's Joint Option = {1.} THEN Quantity Preference Norms1 = High(0) 4) ELSE Quantity Preference Norms1 = Medium(--)	H W C	{1.} {1.} {=1.} 0	{4.} {2.} --	{1.} {3.} --	{2.} {2.} {=2.} 1	{1.} {2.} --	{2.} {2.} {=2.} 1	{2.} {4.} --	{3.} {1.} --

			iv.	..Many daughters or few daughters? (Husband & Wife questionnaire)	<u>Quantity Preference Norms2:</u> Low(1) Medium(--) High(0) <u>Answer options (one):</u> 1. Many daughters 2. Few daughters 3. No difference 4. Don't know <u>Coding rule:</u> 1) USE Only the same option {} noted for a Husband and Wife AS Couple's Joint Option {=} 2) IF Couple's Joint Option = {2.} THEN Quantity Preference Norms2 = Low(1) 3) IF Couple's Joint Option = {1.} THEN Quantity Preference Norms2 = High(0) 4) ELSE Quantity Preference Norms2 = Medium(--)	H W C	{2.} {1.} --	{4.} {2.} --	{2.} {3.} --	{2.} {2.} {=2.} 1	{2.} {2.} {=2.} 1	{4.} {2.} --	{2.} {4.} --	{3.} {3.} {=3.} --

			v.	..Many sons or few daughters? (Husband & Wife questionnaire)	<u>Quantity Preference Norms3:</u> Low(1) Medium(--) High(0) <u>Answer options (one):</u> 1. Many sons 2. Few daughters 3. No difference 4. Don't know <u>Coding rule:</u> 1) USE Only the same option {} noted for a Husband and Wife AS Couple's Joint Option {=} 2) IF Couple's Joint Option = {2.} THEN Quantity Preference Norms3 = Low(1) 3) IF Couple's Joint Option = {1.} THEN Quantity Preference Norms3 = High(0) 4) ELSE Quantity Preference Norms3 = Medium(--)	H W C	{1.} {1.} {=1.} 0	{1.} {2.} --	{2.} {3.} --	{2.} {2.} {=2.} 1	{2.} {2.} {=2.} 1	{2.} {2.} {=2.} 1	{2.} {4.} --	{1.} {3.} --

			vi.	..Few sons or many daughters? (Husband & Wife questionnaire)	<u>Quantity Preference Norms4:</u> Low(1) Medium(--) High(0) <u>Answer options (one):</u> 1. Few sons 2. Many daughters 3. No difference 4. Don't know <u>Coding rule:</u> 1) USE Only the same option {} noted for a Husband and Wife AS Couple's Joint Option {=} 2) IF Couple's Joint Option = {1.} THEN Quantity Preference Norms4 = Low(1) 3) IF Couple's Joint Option = {2.} THEN Quantity Preference Norms4 = High(0) 4) ELSE Quantity Preference Norms4 = Medium(--)	H W C	{1.} {2.} --	{2.} {1.} --	{1.} {3.} --	{1.} {1.} {=1.} 1	{1.} {4.} --	{1.} {2.} --	{2.} {1.} --	{1.} {4.} --

Table A5.18	**Model 3: Bargaining and Social Norms** **Condition 6/Outcome 1W: Wife's Fertility Demand**											
Conceptualisation:	**Q. No.**		**Question:**	**Answer Options &** **Logical Engineering:**	**Case ID:**							
	M 3,				**44**	**28**	**33**	**60**	**22**	**12**	**50**	**8**
				<u>Wife's Fertility Demand:</u> Low(1) Medium(--) High(0) <u>Coding rule:</u> 1) IF Dynamic S/D Preference Based Fertility Demand = Present(0) AND Unrealised Fertility = Absent(0) THEN Wife's Fertility Demand = High(0) 2) IF Dynamic S/D Preference Based Fertility Demand = Absent(1) or Partial(--) AND Unrealised Fertility = Present(1) THEN Wife's Fertility Demand = Low(1) 3) ELSE Wife's Fertility Demand ( ) = Demand At Start ( )	0	1	1	1	--	1	1	1

	6)											
Quantity and sex composition of children demanded at start of marriage		a)	How many sons and how many daughters did you want to have when you first got married? (Wife questionnaire M2, 4a)	<u>Demand At Start:</u> Low(1) Medium(--) High(0) <u>Answer options (both):</u> 1. Number of sons: 2. Number of daughters: <u>Coding rule:</u> 1) IF Number of sons + Number of daughters ≤ 2 THEN Demand At Start = Low(1) 2) IF Number of sons + Number of daughters = 3 THEN Demand At Start = Medium(--) 3) IF Number of sons + Number of daughters ≥ 4 THEN Demand At Start = High(0)	{1+1 = 2} 1	{1+1 =2} 1	{1+1 = 2} 1	{2+2 = 4} 0	{2+1 = 3} --	{1+1 = 2} 1	{1+1 = 2} 1	{1+1 = 2} 1
Dynamic son/daughter - preference based fertility demand		b)	Before each birth, were you hoping for a boy or girl to be born? (Wife questionnaire M2, 4b)	<u>Dynamic S/D Preference Based Fertility Demand:</u> Absent(1) Partial(--) Present(0) <u>Answer options:</u> For each birth, starting from the first: Preference (one): 1. Boy	{NB, GB, GB, GG} 0	{NG, B— still-birth, NB} 1	{BB, GB, GB, BG} 1	{--G still-birth GB, BB} 1	{BB, NG, NB twins} 1	{NG neo-natal death, NB} 1	{NG, BG, BB, BG, NB} 1	{BB, GG} --

			Actual outcome: (Husband questionnaire M1, 4b)	2. Girl 3. No preference Actual outcome (one): 1. Boy 2. Girl <u>Coding rule:</u> 1) IF s/d preference held for the last birth is consistent with a shift of *living* children (Actual outcome excluding stillbirths and mortalities) towards the overall sex composition specified in Demand At Start (above) AND with the birth of the last child, the *living* number of children is ≤ the total quantity of children specified in Demand At Start THEN Dynamic S/D Preference Based Fertility Demand = Partial(--) 2) IF the s/d preference held for the last birth is consistent with a shift of *living* children (Actual outcome excluding stillbirths and mortalities) towards the overall sex composition specified in Demand At Start (above) AND with the birth of the last child, the *living* number of children is > the total quantity of children specified in Demand At Start THEN Dynamic S/D Preference Based Fertility Demand = Present(0)								

				3) ELSE Dynamic S/D Preference Based Fertility Demand = Absent(1) <u>Data Notes:</u> 1) Preference and outcome is displayed in the format PreferenceOutcome Stillbirth/Mortality with data for each child separated by a comma using the following key: Boy {B} Girl {G} No preference {N} E.g. {BG stillbirth,} indicates a Boy was preferred, a Girl was the outcome but was stillbirth								
Final fertility demanded		c)	After how many children did you want no more children? (Wife questionnaire M2, 4c)	<u>Demand At Finish:</u> Low(1) Medium(--) High(0) <u>Answer options:</u> Number of children already born: <u>Coding rule:</u> 1) CALCULATE the Number of living children demanded by explicIty including non-living children that were born (stillbirths, neonatal and child mortalities) in the Number of children already born (after which no more children were wanted), where these non-living children have not already been included in the response, and then deduct non-living children from the Number of children already born to give	{4 living} 0	{3 born - 1 stillbirth =2 living} 1	{4 living} 0	{3 born - 1 stillbirth = 2 living} 1	{3 living} --	{2 born - 1 neonatal mortality = 1 living} 1	{5 living} 0	{2 living} 1

				Number of living children demanded {= } (see data notes below). 2) IF Number of living children demanded ≤ 2 THEN Demand at Finish = Low(1) 3) IF Number of living children demanded = 3 THEN Demand at Finish = Medium(--) 4) IF Number of living children demanded ≥ 4 THEN Demand at Finish = High(0) <u>Data notes:</u> 1) W28 included a stillbirth, whereas W60 did not include a stillbirth in their responses to this question. W12 ideally wanted 2 children but experienced a neonatal mortality. W8 wanted 3 children but her last pregnancy resulted in a miscarriage after which she was satisfied with 2 living children. For clarity, data displayed for this question in this table explicitly displays and distinguishes between the Number of children already born and the Number of living children, and uses the latter in the coding of the condition values.								

Unwanted fertility		d)	How many children were born after this? (Wife questionnaire M2, 4d)	<u>Unwanted Fertility:</u> Absent(1) Present(0) <u>Answer options:</u> Number of children born after this: <u>Coding rule:</u> 1) IF Number of children born after this = 0 THEN Unwanted Fertility = Absent(1) 2) ELSE Unwanted Fertility = Present(0)	{0} 1	{0} 1	{0} 1	{0} 1	{1 (twin)} 0	{0} 1	{0} 1	{0} 1
Unrealised fertility incidences		e)	Did you have any pregnancies that resulted in a miscarriage or stillbirth? (Wife questionnaire M1, 4e)	<u>Unrealised Fertility:</u> Present(1) Absent(0) <u>Answer options (one):</u> 1. Yes 2. No IF YES, a) Number: For each unsuccessful pregnancy: b) Birth order: c) Cause/unkown: <u>Coding rule:</u> 1) IF Option {1.} THEN Unrealised Fertility = Present(1) 2) ELSE Unrealised Fertility = Absent(0)	{2.} 0	{1., 1, 2nd, mother injury} 1	{2.} 0	{1., 1, 1st, Un-known} 1	{2.} 0	{2.} 0	{2.} 0	{1., 1, 3rd, Super-natural Incident} 1

Child/infant/ neonate mortality-driven fertility demand		f)	Has there been any death of living children? (Wife questionnaire M1, 4f)	<u>C/I/N Mortalities:</u> Absent(1) Present(0) <u>Answer options (one):</u> 1. Yes 2. No IF YES, a) Number of deaths: For each child who died: b) Birth order, Sex, Age at death, Cause <u>Coding rule:</u> 1) IF Option {2.} THEN C/I/N Mortalities = Absent(1) 2) ELSE C/I/N Mortalities = Present(0)	{2.} 1	{2.} 1	{2.} 1	{2.} 1	{2.} 1	[1., 1, 1st, F, 6 days, Under-weight, refused milk} 0	{2.} 1	{2.} 1

Child permanent-injury driven fertility demand		g)	Has there been any permanent injury to children? (Wife questionnaire M1, 4g)	<u>Child Permanent Injuries:</u> Absent(1) Present(0) <u>Answer options (one):</u> 1. Yes 2. No IF YES, a) Number of children injured: For each child (the most serious injury each): b) Birth order, Sex, Age at injury, Cause <u>Coding rule:</u> 1) IF Option {2.} THEN Child Permanent Injuries = Absent(1) 2) ELSE Child Permanent Injuries = Present(0)	{1., 1, 2nd, M, 4yrs, Burnt} 0	{2.} 1	{2.} 1	{2.} 1	{2.} 1	{2.} 1	{2.} 1	{2.} 1

Table A5.19

Model 4: Family Planning
Condition 1: Family Planning Programming & N.G.O Exposure

Condition:	Conceptualisation & SDL:	Question Number		Question:	Answer Options & Logical Engineering:	Case ID:							
		M4,				**44**	**28**	**33**	**60**	**22**	**12**	**50**	**8**
Family Planning Programming & N.G.O Exposure		1)			<u>Family Planning Programming & N.G.O Exposure:</u> High(1) Medium(--) Low(0) <u>Coding rule:</u> 1) IF FROM Exposure to Fieldworker Visits, Exposure to Family Planning Messages, Exposure to Public Sector Programming and N.G.O Family Planning Influences through contraceptive acquisition, ANY 2 (or more) = Present/High(1) THEN Family Planning Programming & N.G.O Exposure = High(1) 2) IF FROM Exposure to Fieldworker Visits, Exposure to Family Planning Messages, Exposure to Public Sector Programming and N.G.O Family Planning Influences through contraceptive acquisition, ANY 2 (or more) = Absent/Low(0) THEN Family Planning Programming & N.G.O	1	1	1	1	--	--	0	0

					Exposure = Low(0) 3) ELSE Family Planning Programming & N.G.O Exposure = Medium(--)								
	Frequency of visits by fieldworkers for family planning services	a)			<u>Exposure to Fieldworker Visits:</u> High(1) Medium(--) Low(0) <u>Coding rule:</u> 1) Exposure to Fieldworker Visits ( ) = Fieldworker Exposure Before Last Childbirth ( )	1	0	1	1	--	1	0	0
			i.	In the period during your marriage before your last successful childbirth, how many months on average used to pass between family planning visits from fieldworkers? (Wife questionnaire) <u>SD Linkage:</u> BDHS 2007	<u>Fieldworker Exposure Before Last Childbirth:</u> High(1) Medium(--) Low(0) <u>Answer options (one):</u> 1. Number of months between visits: 2. Never visted <u>Coding rule:</u> 1) IF Option {1.} n <= 3 THEN Fieldworker Exposure Before Last Childbirth = High(1) 2)) IF Option {1.} n >= 4 THEN Fieldworker Exposure Before Last Childbirth = Medium(--)	{n= 1.5} 1	{2.} 0	{n= 1} 1	{n= 0.5} 1	{n= 4} --	{n= 2.5} 1	{2.} 0	{2.} 0

					3) IF Option {2.} THEN Fieldworker Exposure Before Last Childbirth = Low(0) <u>Data notes:</u> W44 stated sometimes 2 times a month, sometimes once every 2 to 3 months, noted as 1.5 W28 stated that she and women she knew used to visit the family planning clinic W60 stated 2 to 3 times a month, noted as 0.5 W12 stated 2 to 3 months, noted as 2.5, but also mentioned she usually went to the clinic W50 stated she used to visit the clinic								
			/i	IF {1.}: What type of fieldworker most frequently visited you? <u>SD Linkage:</u> BDHS 2007	<u>Type of Fieldworker Visiting Before Last Childbirth:</u> <u>Answer options (one):</u> 1. Govt. Family Planning Fieldworker 2. Govt. Health Worker 3. N.G.O Worker 4. Other (note): <u>Coding rule:</u> NOT CODED – However note that W44 and W33 both with Fertility Outcome = High(0) specified Govt. Workers {1.} and {2.}	{1.}	{NA}	{2.}	{3.}	{3.}	{3.}	{NA}	{NA}

			ii.	After your last successful childbirth, how many months on average used to pass between family planning visits from fieldworkers? (Wife questionnaire) <u>SD Linkage:</u> BDHS 2007	<u>Fieldworker Exposure After Last Childbirth:</u> Present(1) Absent(0) <u>Answer options (one):</u> 1. Number of months between visits: 2. Never visted <u>Coding rule:</u> 1) IF Option {1.} n >= 1 THEN Fieldworker Exposure After Last Childbirth = Present(1) 2) IF Option {2.} THEN Fieldworker Exposure After Last Childbirth = Absent(0) <u>Data notes:</u> W44 stated 1 to 2 times a month, noted as {n=1}. W28 stated she and women she knew used to visit the family planning clinic W12 stated she used to visit the clinic W50 stated she used to visit the clinic	{n=1} 1	{2.} 0	{n=1} 1	{2.} 0	{2.} 0	{2.} 0	{2.} 0	{2.} 0

			/i.	IF {1.}: What type of fieldworker most frequently visited you? <u>SD Linkage:</u> BDHS 2007	<u>Type of Fieldworker Visiting After Last Childbirth:</u> <u>Answer options (one):</u> 1. Govt. Family Planning Fieldworker 2. Govt. Health Worker 3. N.G.O Worker 4. Other (note): <u>Coding rule:</u> NOT CODED – However note that W44 and W33 both with Fertility Outcome = High(0) specified Govt. Workers {1.} and {2.}, and all other cases are {NA} because they exhibit Fieldworker Exposure After Last Childbirth = Absent(0) in M4, 1aii above.	{1.}	{NA}	{2.}	{NA}	{NA}	{NA}	{NA}	{NA}
	Exposure to family planning messages	b)			<u>Exposure to Family Planning Messages:</u> High(1) Medium(--) Low(0) <u>Coding rule:</u> 1) Exposure to Family Planning Messages ( ) = Variety of Message Sources Exposed to Before Last Childbirth ( )	--	1	1	1	1	--	0	0

			i.	In the period during your marriage before your last successful childbirth, where did you see or hear messages about family planning? <u>SD Linkage:</u> BDHS 2007	<u>Variety of Message Sources Exposed to Before Last Childbirth:</u> High(1) Medium(--) Low(0) <u>Answer options (one+):</u> 1. Radio 2. Television 3. Newspaper 4. Magazine 5. Poster 6. Billboard 7. Leaflet 8. Community event 9. Other (note): <u>Coding rule:</u> 1) CALCULATE the number of message sources {n=} 2) IF n => 6 THEN Variety of Message Sources Exposed to Before Last Childbirth = High(1) 3) IF n = 4 or n = 5 THEN Variety of Message Sources Exposed to Before Last Childbirth = Medium(--) 4) IF n <= 3 THEN	{1.2.5.6.9: FP Wkr} {n=5} --	{1.2.3.5.6.8.} {n=6} 1	{1.2.3.5.6.7.8.} {n=7} 1	{2.3.4.5.6.7.8.} {n=7} 1	{1.2.4.5.6.7.9: FP Wkr} {n=7} 1	{1.2.5.6.8.} {n=5} --	{1.2.6.} {n=3} 0	{None} {n=0} 0

					Variety of Message Sources Exposed to Before Last Childbirth = Low(0) <u>Data notes:</u> W8 stated that she never heard or saw any messages, noted as {None}.								
			ii.	In the period during your marriage before your last successful childbirth, where did you see or hear the most messages about family planning? <u>SD Linkage:</u> BDHS 2007	<u>Most Exposed to Message Source Before Last Childbirth:</u> <u>Answer options (one):</u> 1. Radio 2. Television 3. Newspaper 4. Magazine 5. Poster 6. Billboard 7. Leaflet 8. Community event 9. Other (note): <u>Coding rule:</u> 1) NOT CODED – This is a facilitating question leading to the next. <u>Data notes:</u> W8 stated that she never heard or saw any messages, noted as {None}	{9: FP Wkr}	{2.}	{2.}	{9: ngo clinic}	{2.}	{2.}	{2.}	{None}
			iii.	In the period during your marriage before your last successful childbirth, how many times a month would you	<u>Frequency of Most Exposed to Message Source Before Last Childbirth:</u> High(1) NA(--) Low(0)	{n=2} 0	{n= 2.5} 0	{n= 2.5} 0	{n= 2} 0	{n= 17.5} 1	Skip-ped --	{n= 30} 1	{n= 0} 0

				see or hear family planning messages through this means? SD Linkage: BDHS 2007	Answer options (one): 1. Number per month: Coding rule: 1) IF Number per month >= 15 THEN Frequency of Most Exposed to Message Source Before Last Childbirth = High(1) 2) IF Number per month <=9 THEN Frequency of Most Exposed to Message Source Before Last Childbirth = Low(0) 3) ELSE Frequency of Most Exposed to Message Source Before Last Childbirth = NA/Medium(--) Data notes: W44 stated 2 times a month, sometimes even every few days, noted as 2 per month. W28 stated 2 to 3 times per month, noted as 2.5 W33 stated 2 to 3 times per month, noted as 2.5 W22 stated 15 to 20 times a month, noted as 17.5 W12 stated very often, noted as Skipped W8 stated that she never heard or saw any messages, noted as {n=0}								

			iv.	After your last successful childbirth, where did you see or hear messages about family planning? SD Linkage: BDHS 2007	Variety of Message Sources Exposed to After Last Childbirth: High(1) Medium(--) Low(0) Answer options (one+): 1. Radio 2. Television 3. Newspaper 4. Magazine 5. Poster 6. Billboard 7. Leaflet 8. Community event 9. Other (note): Coding rule: 1) CALCULATE the number of message sources {n=} 2) IF n => 6 THEN Variety of Message Sources Exposed to After Last Childbirth = High(1) 3) IF n = 4 or n = 5 THEN Variety of Message Sources Exposed to After Last Childbirth = Medium(--) 4) IF n <= 3 THEN Variety of Message Sources Exposed to After Last Childbirth = Low(0)	{2.9: FP Wkr} {n=2} 0	{2.3. 5.6. 8.} {n=5} --	{2. 3.5. 6.8.} {n=5} --	{2. 9: ngo clinic} {n=2} 0	{2. 3.4. 5.6. 7.8.} {n=7} 1	{2. 8.} {n=2} 0	{2.} {n=1} 0	{9: ngo} {n=1} 0

					Data notes: W8 stated she could not remember when exposed to these messages or their content, but mentioned some casual indirect exposure to family planning messages through a micro-finance ngo, noted as {n=1}. Whether the response is noted as n=1 or n=0 is of no analytical consequence because the threshold for Low(0) is n <= 3.								
			v.	After your last successful childbirth, where did you see or hear the most messages about family planning? SD Linkage: BDHS 2007	Most Exposed to Message Source After Last Childbirth: Answer options (one): 1. Radio 2. Television 3. Newspaper 4. Magazine 5. Poster 6. Billboard 7. Leaflet 8. Community event 9. Other (note): Coding rule: 1) NOT CODED – This is a facilitating question leading to the next. Data notes: W8 stated here that she never heard or saw any messages, noted as {None}, but see data notes for W8 in question iv. above.	{2.}	{9: clinic}	{9: clinic}	{9: ngo clinic}	{2.}	{8.}	{2.}	{None}

			vi.	After your last successful childbirth, how many times a month would you see or hear family planning messages through this means? SD Linkage: BDHS 2007	Frequency of Most Exposed to Message Source After Last Childbirth: High(1) NA(--) Low(0) Answer options (one): 1. Number per month: Coding rule: 1) IF Number per month >= 15 THEN Frequency of Most Exposed to Message Source After Last Childbirth = High(1) 2) IF Number per month <=9 THEN Frequency of Most Exposed to Message Source After Last Childbirth = Low(0) 3) ELSE Frequency of Most Exposed to Message Source After Last Childbirth = NA/Medium(--) Data notes: W44 stated after a few days, noted as 5 W33 stated 2 to 3 times per month, noted as 2.5 W60 stated once in every three months, noted as 0.3 W22 stated 20 to 25 times times per	{n= 5} 0	{n= 1} 0	{n= 2.5} 0	{n= 0.3} 0	{n= 22.5} 1	{n= 0.3} 0	{n= 30} 1	{n= 0} 0

					month, noted as 22.5 W12 stated once every 3 to 4 months, noted as 0.3 W8 stated that she never heard or saw any messages, noted as {n=0}								
	Exposure to public sector programming and N.G.O family planning influences through contraceptive acquisition	c)			<u>Exposure to Public Sector Programming and N.G.O Family Planning Influences through contraceptive acquisition:</u> Present(1) NA(--) Absent(0) <u>Coding rule:</u> 1) Exposure to Public Sector Programming and N.G.O Family Planning Influences through contraceptive acquisition ( ) = Contraceptives Sourced Mainly From the Public Sector or N.G.O Sector Before Last Childbirth ( )	1	1	1	1	0	0	--	--
			i.	In the period during your marriage before your last successful childbirth, what was the main source you used for modern contraceptives? <u>SD Linkage:</u> BDHS 2007	<u>Contraceptives Sourced Mainly From the Public Sector or N.G.O Sector Before Last Childbirth:</u> Present(1) NA(--) Absent(0) <u>Answer options (one):</u> 1. Public sector 2. Private medical sector 3. NGO sector 4. Other (note):	{1.} 1	{3.} 1	{3.} 1	{3.} 1	{2.} 0	{2.} 0	{NA} --	{NA} --

					<u>Coding rule:</u> 1) IF Option {1.} or {3.} THEN Contraceptives Sourced Mainly From the Public Sector or N.G.O Sector Before Last Childbirth = Present(1) 2) IF Option {NA} THEN Contraceptives Sourced Mainly From the Public Sector or N.G.O Sector Before Last Childbirth = NA(--) 3) ELSE Contraceptives Sourced Mainly From the Public Sector or N.G.O Sector Before Last Childbirth = Absent(0) <u>Data notes:</u> W50 stated she did not use any method during this period, noted as {NA} W8 stated she did not use any method during this period, noted as {NA}								

			ii.	After your last successful childbirth, what is the main source you have used for modern contraceptives? SD Linkage: BDHS 2007	Contraceptives Sourced Mainly From the Public Sector or N.G.O Sector After Last Childbirth: Present(1) NA(--) Absent(0) Answer options (one): 1. Public sector 2. Private medical sector 3. NGO sector 4. Other (note): Coding rule: 1) IF Option {1.} or {3.} THEN Contraceptives Sourced Mainly From the Public Sector or N.G.O Sector After Last Childbirth = Present(1) 2) IF Option {NA} THEN Contraceptives Sourced Mainly From the Public Sector or N.G.O Sector After Last Childbirth = NA(--) 3) ELSE Contraceptives Sourced Mainly From the Public Sector or N.G.O Sector After Last Childbirth = Absent(0)	{1.} 1	{3.} 1	{3.} 1	{3.} 1	{3.} 1	{2.} 0	{1.} 1	{2.} 0

Table A5.20

Model 4: Family Planning
Condition 2: Willingness to Limit Fertility and Use Modern Family Planning Methods

Condition:	**Conceptual-isation:**	**Question Number**		**Question:**	**Answer Options & Logical Engineering:**	**Case ID:**							
		M4,				**44**	**28**	**33**	**60**	**22**	**12**	**50**	**8**
Willingness to limit fertility and use modern family planning methods		2)			<u>Willingness to Limit Fertility and Use Modern Family Planning Methods:</u> High(1) Medium(--) Low(0) <u>Coding rule:</u> 1) Willingness to Limit Fertility and Use Modern Family Planning Methods ( ) = Group Fertility Outcome Norm ( )	0	--	--	1	--	1	--	--
	Compatibility of limiting fertility with internalised values	a)			<u>Compatibility of Limiting Fertility with Internalised Values:</u> Present(1) Absent(0) <u>Coding rule:</u> 1) IF Moral Objection to Limiting Fertility = Present(0) AND Life Cycle Stage Relevance of Moral Objection to Limiting Fertility = Present(0) THEN Compatibility of Limiting Fertility with Internalised Values = Absent(0)	1	1	1	1	1	1	1	1

					2) ELSE Compatibility of Limiting Fertility with Internalised Values = Present(1)								
			i.	Have you ever thought that limiting fertility is morally wrong? (Wife questionnaire)	<u>Moral Objection to Limiting Fertility:</u> Absent(1) Present(0) <u>Answer options (one):</u> 1. Yes 2. No <u>Coding rule:</u> 1) IF Option {2.} THEN Moral Objection to Limiting Fertility = Absent(1) 2) ELSE Moral Objection to Limiting Fertility = Present(0)	{1.} 0	{2.} 1	{2.} 1	{2.} 1	{2.} 1	{2.} 1	{1.} 0	{2.} 1
			/i	IF {1.}: What are the reasons:	<u>Reasons for Moral Objection:</u> <u>Answer options:</u> 1. Reasons: <u>Coding rule:</u> NOT CODED – no relevant data captured	Skip-ped	{NA}	{NA}	{NA}	{NA}	{NA}	Skip-ped	{NA}

			/ii.	At what stage of your life did you think it was wrong? (Wife questionnaire)	<u>Life Cycle Stage Relevance of Moral Objection to Limiting Fertility:</u> Absent(1) Neutral(--) Present(0) <u>Answer options (one+):</u> 1. Before marriage 2. Start of marriage before first childbirth 3. Between first childbirth and last successful childbirth 4. After last successful childbirth 5. Always thought it was morally wrong <u>Coding rule:</u> 1) IF Option {1.} or {4.} THEN Life Cycle Stage Relevance of Moral Objection to Limiting Fertility = Absent(1) 2) IF Option {2.}, {3} or {5.} THEN Life Cycle Stage Relevance of Moral Objection to Limiting Fertility = Present(0) 3) ELSE Life Cycle Stage Relevance of Moral Objection to Limiting Fertility = Neutral(--)	{4.} 1	{NA} --	{NA} --	{NA} --	{NA} --	{NA} --	{4.} 1	{NA} --

	Psychic costs associated with additional fertility after last successful childbirth	b)			<u>Psychic Costs of Additional Fertility:</u> High(1) Medium(--) Low(0) <u>Coding rule:</u> NOT CODED – data is almost invariable across bi/i, bi/ii and bi/iii.								
			i.	After your last successful childbirth, how many incidents amongst your own relatives and your husbands relatives did you know about of:									
			/i.	Women dying due to childbirth	<u>Women dying due to childbirth:</u> <u>Answer options {all three}:</u> 1. Number of women deaths: 2. Relationship of each woman to wife or husband: 3. Place of delivery (with each relationship) a. Home b. Public sector c. NGO sector d. Private <u>Coding rule:</u> NOT CODED – data is almost invariable	{n=0}	{n=0}	{n=0}	{n=0}	{n=0}	{n=1, resp-ond-ents cous-in, in hosp-ital but type unkn-own}	{n=0}	{n=0}

			/ii.	Stillbirths SD Linkage: BDHS 2007	Stillbirths: Answer options {all three}: 1. Number of stillbirths: 2. Relationship of each child's mother to wife or husband: 3. Place of delivery (with each relationship) a. Home b. Public sector c. NGO sector d. Private Coding rule: NOT CODED – data is invariable	{n=0}	{n=0}	{n=0}	{n=0}	{n=0}	{n=0}	{n=0}	{n=0}
			/iii.	New born deaths SD Linkage: BDHS 2007	New born deaths: Answer options {all three}: 1. Number of new born deaths: 2. Relationship of each child's mother to wife or husband: 3. Place of delivery (with each relationship) a. Home b. Public sector c. NGO sector d. Private Coding rule: NOT CODED – data is invariable	{n=0}	{n=0}	{n=0}	{n=0}	{n=0}	{n=0}	{n=0}	{n=0}

	Conformity of the fertility outcome at last successful childbirth with family member fertility preferences	c)		After you had your last successful childbirth:	<u>Conformity of the Fertility Outcome with Family Member Preferences:</u> <u>Coding rule:</u> NOT CODED – data for ci, cii and ciii is unreliable, see data notes in ciii.								
			i.	Who wanted you to have more children?	<u>Conformity with Family Fertility Preference1:</u> <u>Answer options (one+):</u> 1. Husband 2. Father in-law 3. Mother in-law 4. Father 5. Mother 6. Other (note): <u>Additonal option added post-interview:</u> 7. Nobody <u>Coding rule:</u> NOT CODED – data unreliable, see data notes in ciii.	{7.}	{1.}	{7.}	{7.}	{7.}	{2.3.}	{7.}	{7.}
			ii.	Who would have preferred if you had borne fewer children?	<u>Conformity with Family Fertility Preference2:</u> <u>Answer options (one+):</u> 1. Husband 2. Father in-law 3. Mother in-law 4. Father 5. Mother 6. Other (note):	{1.2. 3.}	{6: resp-ond-ent}	{1.3. 4.5.}	{1.2. 3.4. 5.6: resp-ond-ent}	{1.6: resp-ond-ent}	{1.}	{5.}	{6: resp-ond-ent}

					<u>Coding rule:</u> NOT CODED – data unreliable, see data notes in ciii.								
			iii.	Who were satisfied, and preferred neither more children nor fewer children?	<u>Conformity with Family Fertility Preference3:</u> <u>Answer options (one+):</u> 1. Husband 2. Father in-law 3. Mother in-law 4. Father 5. Mother 6. Other (note): <u>Coding rule:</u> NOT CODED – data unreliable, see data notes below. <u>Data notes:</u> W44 identified {1.} for both this and the previous question W33 identified {3.} for both this and the previous question W60 identified {1.2.3.4.5.} for both this and the previous question W22 identified {1. And 6: respondent} for both this and the previous question – note the last two children born were twins. W12 also identified {1.} in prior question ii. and {2.3.} in prior question i.	{1.}	{1.3.}	{3.6: sister -in- law}	{1.2. 3.4. 5.}	{1.6: resp- ond- ent}	{1.2. 3.}	{1.}	{1.}

	Group Fertility Outcome Norm	d)			<u>Group Fertility Outcome Norm:</u> Low(1) Indeterminate(--) High(0) <u>Coding rule:</u> 1) IF FROM Fertility Outcome of 1st Group Member, Fertility Outcome of 2nd Group Member, Fertility Outcome of 3rd Group Member, ANY 2 or more = Low(1) THEN Group Fertility Outcome Norm = Low(1) 2) IF FROM Fertility Outcome of 1st Group Member, Fertility Outcome of 2nd Group Member, Fertility Outcome of 3rd Group Member, ANY 2 (or more) = High(0) THEN Group Fertility Outcome Norm = High(0) 3) ELSE Group Fertility Outcome Norm = Indeterminate(--)	0	--	--	1	--	1	--	--

			i.	Thinking about the three married women friends or relatives who you are emotionally closest to, without mentioning their names, answer the following questions:									
			/i.	1st:	<u>Fertility Outcome of 1st Group Member:</u> Low (1) NA/Medium (--) High (0) <u>Answer options (1-5):</u> 1. Relationship to respondent: 2. Qualification level attained: a. None b. Literacy c. Primary d. Secondary e. College f. BA/BCom/BSc g. MA/MCom/MSc h. PhD i. Other (note):	{neigh-bour., b., UK., 1., 5.} 0	{mot-her., a., NA., 3., 3.} 0	{sister -in-law., c., b., 0., 2.} 1	{neigh-bour., a., NA., 0., 2.} 1	{neigh-bour., UK., UK., 1., 0.} 1	{neigh-bour., c., b., 2., 1.} --	{mot-her., a., NA., 4., 2.} 0	{NA} --

					3. Type of institution attended: a. Madrassah b. Bengali medium institution c. English medium institution d. Abroad (where): 4. Number of living sons: 5. Number of living daughters: <u>Coding rule:</u> 1) IF Number of living sons + Number of living daughters <= 2 THEN Fertility Outcome of 1st Group Member = Low(1) 2) IF Number of living sons + Number of living daughters >= 4 THEN Fertility Outcome of 1st Group Member = High(0) 3) ELSE Fertility Outcome of 1st Group Member = NA/Medium(--) <u>Data notes:</u> W8 could not specify any person she was close to, noted as {NA}.								

			/ii.	2nd:	<u>Fertility Outcome of 2nd Group Member:</u> Low (1) NA/Medium (--) High (0) <u>Answer options (1-5):</u> 1. Relationship to respondent: 2. Qualification level attained: a. None b. Literacy c. Primary d. Secondary e. College f. BA/BCom/BSc g. MA/MCom/MSc h. PhD i. Other (note): 3. Type of institution attended: a. Madrassah b. Bengali medium institution c. English medium institution d. Abroad (where): 4. Number of living sons: 5. Number of living daughters	{neigh-bour., b., UK., 3., 2.} 0	{NA} --	{sister-in-law., c., b., 2., 1.} --	{neigh-bour., a., NA., 1., 1.} 1	{neigh-bour., a., NA., 3., 1.} 0	{sister-in-law., c., b., 2., 0.} 1	{NA} --	{NA} --

					<u>Coding rule:</u> 1) IF Number of living sons + Number of living daughters <= 2 THEN Fertility Outcome of 2nd Group Member = Low(1) 2) IF Number of living sons + Number of living daughters >= 4 THEN Fertility Outcome of 2nd Group Member = High(0) 3) ELSE Fertility Outcome of 2nd Group Member = NA/Medium(--) <u>Date notes:</u> W28 could not specify a second person she was close to, noted as {NA}. W50 could not specify a second person she was close to, noted as {NA}. W8 could not specify any person she was close to, noted as {NA}.								

			/iii.	3rd:	<u>Fertility Outcome of 3rd Group Member:</u> Low (1) NA/Medium (--) High (0) <u>Answer options (1-5):</u> 1. Relationship to respondent: 2. Qualification level attained: a. None b. Literacy c. Primary d. Secondary e. College f. BA/BCom/BSc g. MA/MCom/MSc h. PhD i. Other (note): 3. Type of institution attended: a. Madrassah b. Bengali medium institution c. English medium institution d. Abroad (where): 4. Number of living sons: 5. Number of living daughters	{aunt., a., NA., 2., 2.} 0	{NA} --	{sister., c., b., 2., 2.} 0	{neigh-bour., a., NA., 1., 1.} 1	{NA} --	{neigh-bour., c., b., 1., 1.} 1	{NA} --	{NA} --

					<u>Coding rule:</u> 1) IF Number of living sons + Number of living daughters <= 2 THEN Fertility Outcome of 3rd Group Member = Low(1) 2) IF Number of living sons + Number of living daughters >= 4 THEN Fertility Outcome of 3rd Group Member = High(0) 3) ELSE Fertility Outcome of 3rd Group Member = NA/Medium(--) <u>Date notes:</u> W28 could not specify a third person she was close to, noted as {NA}. W22 could not specify a third person she was close to, noted as {NA}. W50 could not specify a third person she was close to, noted as {NA}. W8 could not specify any person she was close to, noted as {NA}.								

	Willingness to utilise available modern family planning methods	e)			<u>Willingness to Utilise Modern Family Planning Methods:</u> High(1) Medium(--) Low(0) <u>Coding rule:</u> 1) Willingness to Utilise Modern Family Planning Methods ( ) = Number of Known Modern Family Planning Methods ( )	1	--	--	0	0	1	1	0
			i.	Can you please name or describe each modern method of family planning that you know about: <u>SD Linkage:</u> BDHS 2007	<u>Number of Known Modern Family Planning Methods:</u> High(1) Medium(--) Low(0) <u>Answer options (one+):</u> 1. Pill 2. IUD 3. Injectables 4. Implants 5. Condoms 6. Female sterilisation 7. Male sterilisation 8. Menstrual regulation 9. Other (note): <u>Coding rule:</u> 1) CALCULATE the Number of Known Modern Family Planning Methods {n=}	{1.3. 5.6.7.} {n= 5} 1	{1.2. 3.5.} {n= 4} --	{1.3. 4.5.} {n= 4} --	{1.3. 5.} {n= 3} 0	{1.3.} {n= 2} 0	{1.2.3. 5.6.7.} {n= 6} 1	{1.2. 3.4. 5.6. 7.} {n= 7} 1	{1.} {n= 1} 0

					2) IF n >= 5 THEN Number of Known Modern Family Planning Methods = High(1) 3) IF n = 4 THEN Number of Known Modern Family Planning Methods = Medium(--) 4) IF n <= 3 THEN Number of Known Modern Family Planning Methods = Low(0)								
	Compatibility of known methods with internalised values	f)			<u>Compatibility of Known Methods with Internalised Values:</u> Present (1) NA(--) Absent(0) <u>Coding rule:</u> 1) IF Moral Objection to Any Known Methods = Absent(1) THEN Compatibility of Known Methods with Internalised Values = Present(1) 2) IF Moral Objection to Any Known Methods = Present(0) AND Life Cycle Stage Relevance of Moral Objection to Certain Methods	1	1	1	0	1	1	1	--

					= Present(0) THEN Compatibility of Known Methods with Internalised Values = Absent(0) 3) ELSE Compatibility of Known Methods with Internalised Values = NA(--)								
			i.	Have you ever thought that any particular family planning methods are morally wrong?	<u>Moral Objection to Any Known Methods:</u> Absent(1) NA(--) Present(0) <u>Answer options (one):</u> 1. Yes 2. No <u>Coding rule:</u> 1) IF Option {2.} THEN Moral Objection to Any Known Methods = Absent(1) 2) IF Option {1.} THEN Moral Objection to Any Known Methods = Present(0) 3) ELSE Moral Objection to Any Known Methods = NA(--)	{2.} 1	{2.} 1	{2.} 1	{1.} 0	{2.} 1	{2.} 1	{2.} 1	{UK} --

			/i.	IF {1.}: Which methods?	<u>Proportion of Known Methods Objected To:</u> <u>Answer options:</u> 1. Methods: <u>Coding rule:</u> NOT CODED - data is almost invariable and does not allow meaningful coding. M4, fi Moral Objection to Any Known Methods above is adequate for capturing the objection.	{NA}	{NA}	{NA}	{All}	{NA}	{NA}	{NA}	{NA}
			/ii.	What reasons?	<u>Reasons for Objection:</u> <u>Answer options:</u> 1. Reasons: <u>Coding notes:</u> NOT CODED – insufficient data for meaningful coding, bearing in mind W60 has a Fertility Outcome = Low(1). <u>Data notes:</u> W60 – The response here contradicts the response to M4, 2ai Moral Objection to Limiting Fertility where 'No' was stated. This response appears to be referring to both the morality of limiting fertility and using contraception to do so. No adjustment however is made to M4, 2ai on the basis of accepting the first response there.	{NA}	{NA}	{NA}	"It is against the wishes of Allah, we are not allowing children to come into this world."	{NA}	{NA}	{NA}	{NA}

			/iii.	At what stage of your life did you think these methods are wrong?	<u>Life Cycle Stage Relevance of Moral Objection to Certain Methods:</u> Absent(1) NA(--) Present(0) <u>Answer options (one+):</u> 1. Before marriage 2. Start of marriage before first childbirth 3. Between first childbirth and last successful childbirth 4. After last successful childbirth 5. Always thought it was morally wrong <u>Coding rule:</u> 1) IF Option {1.} or {4.} THEN Life Cycle Stage Relevance of Moral Objection to Certain Methods = Absent(1) 2) IF Option {2.}, {3} or {5.} THEN Life Cycle Stage Relevance of Moral Objection to Certain Methods = Present(0) 3) ELSE Life Cycle Stage Relevance of Moral Objection to Certain Methods = NA(--)	{NA} --	{NA} --	{NA} --	{5.} 0	{NA} --	{NA} --	{NA} --	{NA} --

	Psychic health costs associated with the use of known methods	g)			<u>Psychic Health Costs Associated With Known Methods:</u> Absent(1) Present(0) <u>Coding rule:</u> 1) Psychic Costs Associated With Known Methods ( ) = Perceived Health Risks of Known Methods ( )	0	1	0	0	1	1	1	0
			i.	Do you believe that using any of the methods you have mentioned are dangerous for a woman's health? <u>SD Linkage:</u> BDHS 2007	<u>Perceived Health Risks of Known Methods:</u> Absent(1) Present(0) <u>Answer options (one):</u> 1. Yes 2. No <u>Coding rule:</u> 1) IF Option {2.} THEN Perceived Health Risks of Known Methods = Absent(1) 2) ELSE Perceived Health Risks of Known Methods = Present(0)	{1.} 0	{2.} 1	{1.} 0	{1.} 0	{2.} 1	{2.} 1	{2.} 1	{1.} 0

			/i.	IF {1.}: Which methods are dangerous?	<u>Perceived Dangerous Methods:</u> <u>Answer options:</u> 1. Methods: <u>Coding rule:</u> NOT CODED - coding cannot proceed in a meaningful manner based on the data for Perceived Dangerous Methods	{Inject-ables}		{Im-plants}	{Pills, Inject-ables}				{Pill}
			/ii.	What reasons?	<u>Reasons:</u> <u>Answer options:</u> 1. Reasons: <u>Coding rule:</u> NOT CODED - coding cannot proceed in a meaningful manner based on the data for Reasons	{causes weak-ness}		{causes excess-ive bleed-ing and weight loss}	{in the respond-ents own exper-ience the pill causes dizz-iness, vomit-ing, inject-ables cause excess bleed-ing}				{causes dizzi-ness}
	Compatibility of known methods with family approval	h)			<u>Compatibility of Known Methods with Family Approval:</u> Present(1) Absent(0) <u>Coding rule:</u> 1) Compatibility of Known Methods with Family Approval ( ) = Family Member Disapproval of Methods ( )	1	1	1	0	1	1	1	1

			i.	Do any family members disapprove of any methods?	<u>Family Member Disapproval of Methods:</u> Absent(1) Present(0) <u>Answer options (one):</u> 1. Yes 2. No <u>Coding rule:</u> 1) IF Option {2.} THEN Family Member Disapproval of Methods = Absent(1) 2) ELSE Family Member Disapproval of Methods = Present(0) <u>Data notes:</u> W22 responded Unknown to this question, but it is assumed that if any family members disapproved enough to talk about it she would have known about their disapproval. Their not talking about it suggests at least tacit approval. Therefore the response is coded as {2.}	{2.} 1	{2.} 1	{2.} 1	{1.} 0	{2.} 1	{2.} 1	{2.} 1	{2.} 1

			/i.	IF {1.}: Which family members?	<u>Disapproval by Particular Family Members:</u> <u>Answer options (one+):</u> 1. Husband 2. Father in-law 3. Mother in-law 4. Father 5. Mother 6. Other (note): <u>Coding rule:</u> NOT CODED - coding cannot proceed in a meaningful manner based on the data for Disapproval by Particular Family Members	{NA}	{NA}	{NA}	{2.}	{NA}	{NA}	{NA}	{NA}
			/ii.	Which method does each disapprove of?	<u>Methods Disapproved Of:</u> <u>Answer options (one+):</u> For each, method disapproved of: <u>Coding rule:</u> NOT CODED - coding cannot proceed in a meaningful manner based on the data for Methods Disapproved Of.	{NA}	{NA}	{NA}	{All}	{NA}	{NA}	{NA}	{NA}
			/iii.	Reasons:	<u>Reasons:</u> <u>Answer options (one+):</u> For each, reasons: <u>Coding rule:</u> NOT CODED - coding cannot proceed in a meaningful manner based on the data for Reasons	{NA}	{NA}	{NA}	"He thinks we are not allowing the children to come to this world."	{NA}	{NA}	{NA}	{NA}

	Conformity with group member usage of the main contraceptive method used	i)			<u>Conformity With Group Member Usage of Contraceptive Method:</u> Present(1) Absent(0) <u>Coding rule:</u> 1) IF Main Method of Contraception Currently Used { } = [Contraceptive Use of 1st Group Member { } OR Contraceptive Use of 2nd Group Member { } OR Contraceptive Use of 3rd Group Member { }] THEN Conformity With Group Member Usage of Contraceptive Method = Present(1) 2) IF Contraceptive Use of 1st Group Member { } = {NA} or {a.} or {c.} AND Contraceptive Use of 2nd Group Member { } = {NA} or {a.} or {c.} AND Contraceptive Use of 3rd Group Member { } = {NA} or {a.} or {c.} THEN Conformity With Group Member Usage of Contraceptive Method = Indeterminate(--)	1	--	1	1	1	1	--	--

					3) ELSE Conformity With Group Member Usage of Contraceptive Method = Absent(0)								
			i.	What is the main method of contraception you (mostly) use now? SD Linkage: BDHS 2007	Main Method of Contraception Currently Used: Answer options (one+): 1. Pill 2. IUD 3. Injectables 4. Implants 5. Condoms 6. Female sterilisation 7. Male sterilisation 8. Menstrual regulation 9. Other (note): 10. None Coding rule: NOT CODED – coding will proceed in combination with responses to ii/i., ii/ii. and ii/iii. below.	{3.}	{3.}	{3.}	{3.}	{3.}	{1.}	{6.}	{1.}
			ii.	Thinking about the three married women friends or relatives you are emotionally closest to, without mentioning their names, what is the main contraceptive									

				method currently used by them?									
			/i.	1st:	Contraceptive Use of 1st Group Member: Answer options (both): 1. Relationship to respondent: 2. a) Does not use b) Method used: c) Unknown Coding rule: 1) USE Answer options in question i (Main Method) to code responses for b) Data notes: W50 stated her mother is a widow (and hence does not require contraception).	{neigh-bour., c.}	{mot-her., a.}	{sister -in-law., b: inject-ables.} {3.}	{neigh-bour., b: inject-ables} {3.}	{neigh-bour., a.}	{neigh-bour., b: pill} {1.}	{mot-her., a.}	{NA}
			/ii.	2nd:	Contraceptive Use of 2nd Group Member: Answer options (both): 1. Relationship to respondent: 2. a) Does not use b) Method used: c) Unknown Coding rule: 1) USE Answer options in question i (Main Method) to code responses for b)	{neigh-bour., b: inject-ables.} {3.}	{NA}	{sister -in-law., b: inject-ables.} {3.}	{neigh-bour., b: pill} {1.}	{neigh-bour., b: inject-bles} {3.}	{sister -in-law., b: pill.} {1.}	{NA}	{NA}

			/iii.	3rd:	<u>Contraceptive Use of 3rd Group Member:</u> <u>Answer options (both):</u> 1. Relationship to respondent: 2. a) Does not use b) Method used: c) Unknown <u>Coding rule:</u> 1) USE Answer options in question i (Main Method) to code responses for b) <u>Data notes:</u> W44 stated her aunt is a widow (and hence does not require contraception).	{aunt., a.}	{NA}	{sister., b: inject-ables} {3.}	{neigh-bour., b: inject-ables} {3.}	{NA}	{neigh-bour., b: pill} {1.}	{NA}	{NA}

Table A5.21

Model 4: Family Planning
Condition 3: Ability to Acquire Modern Family Planning Methods

Condition:	Conceptualisation:	Question Number		Question:	Answer Options & Logical Engineering:	Case ID:							
		M4,				**44**	**28**	**33**	**60**	**22**	**12**	**50**	**8**
Ability to acquire modern family planning methods		3)			Ability to Acquire Modern Family Planning Methods: High(1) Medium(--) Low(0) Coding rule: 1) Ability to Acquire Modern Family Planning Methods ( ) = Ability to Acquire Main Method of Contraception Used ( )	0	1	0	1	1	1	0	0
	Ability to acquire the main method of contraception used	a)			Ability to Acquire Main Method of Contraception Used: High(1) Medium(--) Low(0) Coding rule: 1) Ability to Acquire Main Method of Contraception Used ( ) = Subjective Expense of Mostly Used Method ( )	0	1	0	1	1	1	0	0

	Logistical ease of acquiring the main method used		i.	How easy is it to obtain the contraceptive you (mostly) use now? (Wife questionnaire)	<u>Ease of Obtaining Mostly Used Method:</u> High(1) Medium(--) Low(0) <u>Answer options (one+ Reasons):</u> 1. Very easy 2. Easy 3. Neutral 4. Difficult 5. Very difficult Reasons: <u>Coding rule:</u> 1) IF Option {1.} or {2.} THEN Ease of Obtaining Mostly Used Method = High(1) 2) IF Option {3.} THEN Ease of Obtaining Mostly Used Method = Medium(--) 3) IF Option {4.} or {5.} THEN Ease of Obtaining Mostly Used Method = Low(0)	{2., Easy to find thro-ugh pub-lic serv-ices} 1	{3., under-the-table pay-ments are some-times requ-ired} --	{2., always avail-able at the local ngo clinic} 1	{1., always avail-able at the clinic} 1	{2., easily avail-able at doctor or clinic} 1	{2., avail-able in the shops} 1	{4., had to go to differ-ent places to get steril-ised} 0	{2., avail-able at the shops} 1

	Subjective monetary cost of the main method used		ii.	How would you describe the price of this contraceptive?	<u>Subjective Expense of Mostly Used Method:</u> Low(1) Medium(--) High(0) <u>Answer options(one):</u> 1. Very cheap 2. Cheap 3. Neutral 4. Expensive 5. Very expensive <u>Coding rule:</u> 1) IF Option {1.} or {2.} THEN Subjective Expense of Mostly Used Method = Low(1) 2) IF Option {3.} THEN Subjective Expense of Mostly Used Method = Medium(--) 3) IF Option {4.} or {5.} THEN Subjective Expense of Mostly Used Method = High(0)	{4.} 0	{2.} 1	{4.} 0	{2.} 1	{2.} 1	{2.} 1	{4.} 0	{4.} 0

	Ability to acquire the most preferred method of contraception (if different from above)	b)			<u>Ability to Acquire the Most Preferred Method of Contraception:</u> High(1) Medium(--) Low(0) <u>Coding rule:</u> NOT CODED - data is almost invariable across bi/i, bi/iii and bi/iv.								
			i.	Is there any contraceptive method you would prefer to use instead of the one you (mostly) use now?	<u>Preferred Method to that Currently Used:</u> Absent(1) Present(0) <u>Answer options (one):</u> 1. Yes 2. No <u>Coding rule:</u> 1) IF Option {2.} THEN Preferred Method to that Currently Used = Absent(1) 2) ELSE Preferred Method to that Currently Used = Present(0) <u>Data notes:</u> W50, although sterilised, was asked this question in the sense that if she had a choice. W8 was only aware of the method she was using.	{2.} 1	{2.} 1	{2.} 1	{2.} 1	{2.} 1	{2.} 1	{1.} 0	{2.} 1

			/i.	IF {1.}: Which method would you prefer to use instead of the method you use now?	<u>Preferred Method:</u> <u>Answer options (one):</u> 1. Pill 2. IUD 3. Injectables 4. Implants 5. Condoms 6. Female sterilisation 7. Male sterilisation 8. Menstrual regulation 9. Other (note): <u>Coding rule:</u> NOT CODED – This is a facilitating question leading to the next.	{NA}	{NA}	{NA}	{NA}	{NA}	{NA}	{3.}	{NA}
			/ii.	Why is this your most preferred method?	<u>Reasons Preferred:</u> <u>Answer options:</u> Reasons: <u>Coding rule:</u> NOT CODED - coding cannot proceed in a meaningful manner based on the data for Reasons	{NA}	{NA}	{NA}	{NA}	{NA}	{NA}	"Bec-ause I think this method would suit me."	{NA}

	Logistical ease of acquiring the most-preferred method, not currently used		/iii. (bii)	How easy is it to obtain this new method?	<u>Ease of Obtaining Preferred Method:</u> High(1) NA(--) Low(0) <u>Answer options (one+Reasons):</u> 1. Very easy 2. Easy 3. Neutral 4. Difficult 5. Very difficult Reasons: <u>Coding rule:</u> 1) IF Option {1.} or {2.} THEN Ease of Obtaining Preferred Method = High(1) 2) IF Option {3.} or {NA} THEN Ease of Obtaining Preferred Method = NA(--) 3) IF Option {4.} or {5.} THEN Ease of Obtaining Preferred Method = Low(0)	{NA} --	{NA} --	{NA} --	{NA} --	{NA} --	{NA} --	{5., need to visit local ngo clinic a lot. Some-times it is not avail-able} 0	{NA} --

	Subjective monetary cost of the most-preferred method, not currently used		/iv. (biii)	How would you describe the price of this method?	<u>Subjective Exp. of Pref. Method:</u> Low(1) Medium(--) High(0) <u>Answer options(one):</u> 1. Very cheap 2. Cheap 3. Neutral 4. Expensive 5. Very expensive <u>Coding rule:</u> 1) IF Option {1.} or {2.} THEN Subjective Expense of Preferred Method = Low(1) 2) IF Option {3.} or {NA} THEN Subjective Expense of Preferred Method = NA(--) 3) IF Option {4.} or {5.} THEN Subjective Expense of Preferred Method = High(0)	{NA} --	{NA} --	{NA} --	{NA} --	{NA} --	{NA} --	{4.} 0	{NA} --

Table A5.22

Model 4: Family Planning Model
Dependent Outcome: Fertility Outcome

Condition:	Conceptualisation:	Question Number		Question:	Answer Options & Boolean Coding:	Case ID:							
		M4,				**44**	**28**	**33**	**60**	**22**	**12**	**50**	**8**
Fertility Outcome					Fertility Outcome: Low(1) Medium(--) High(0) Coding rule: 1) IF Number of Living Sons and Daughters <=2 THEN Fertility Outcome = Low(1) 2) IF Number of Living Sons and Daughters =3 THEN Fertility Outcome = Medium(--) 3) IF Number of Living Sons and Daughters >=4 THEN Fertility Outcome = High(0)	0	1	0	1	0	1	0	1

	Number of living children by sex composition and age	a)	i.	How many living sons and daughters do you have and what were their ages at their last birthday? (Wife questionnaire) <u>SD Linkage:</u> BDHS 2007	<u>Number of Living Sons and Daughters:</u> <u>Answer options(both):</u> 1. Number of sons: 2. Number of daughters: <u>Coding rule:</u> 1) CALCULATE Total Number of Sons and Daughters {=} <u>Data notes:</u> Ages are not displayed here	{3,1 =4}	{1,1 =2}	{3,1 =4}	{2,0 =2}	{3,1 =4}	{1,0 =1}	{2,3 =5}	{1,1 =2}